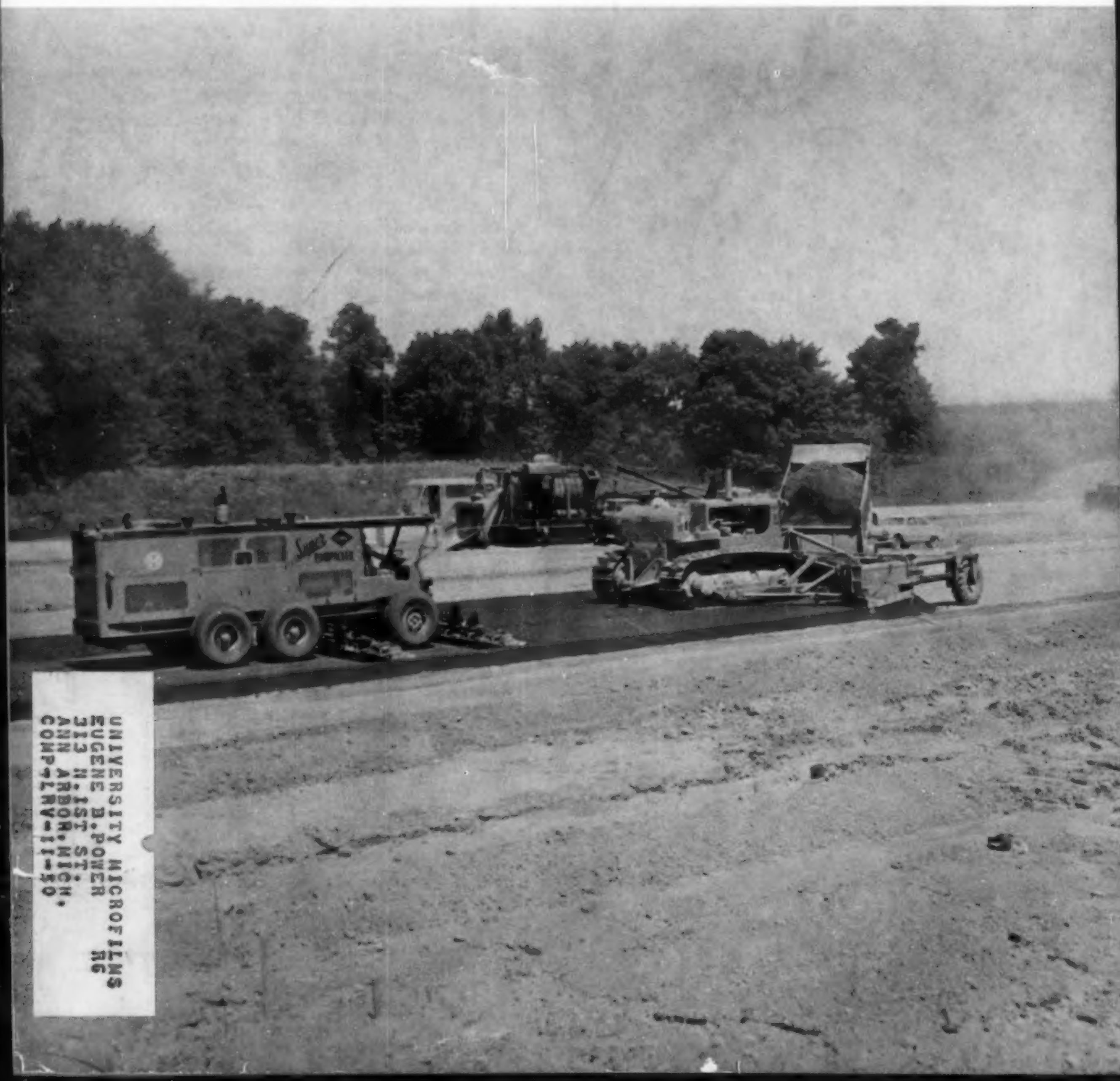
Bigger Push Tractors Can Pay Dividends page 47

August, 1960

ROADS AND STREETS

A GILLETTE PUBLICATION



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4 WAYS TO BETTER PAVING PROFITS

① JACKSON VIBRATORY COMPACTOR
On any major paving project involving the compaction of granular soils, from sand to large rock, or soil-cement mixes the JACKSON MULTIPLE VIBRATORY COMPACTOR will save its cost in jig time. It's faster in attaining 100% specified density, more economical to operate and maintain, and has far greater job adaptability than any other machine. Vibratory units can be arranged to exactly fit the job — individual units manually operated to reach the otherwise inaccessible spots. The machine operates in either direction — no turning required; and each vibratory unit supplies 4200 3-TON BLOWS per minute.

② JACKSON TRAILER COMPACTOR Employs the same vibratory units as the MULTIPLE (up to 6 in a single workhead, or 8 in two). May be pushed or pulled by any prime mover capable of working speeds as low as 50 FPM. Power plant supplies both single and 3-phase, 110-115 Volt, 60 Cycle, AC, and has many uses.

③ JACKSON MANUAL COMPACTOR Uses same vibratory unit as the MULTIPLE COMPACTOR. It's self-propelling, achieves 100% specified density of granular soil in 5" layers at rate of 400 sq. yds. per hour. One man can easily handle hook-up of twin units and double production. Trailer-mounted generator with compactor pick-up feature for universal operation is available. Perfect for a host of applications.

④ MUNICIPAL PAVING For jobs of this type, a JACKSON Vibratory Screed and Portable Power Plant is a very convenient, productive and inexpensive outfit. Strikes off to any crown, undercuts at curbs and side-forms, works right up to and around all obstructions. Two men easily handle it on all slabs up to 30 ft. wide. Rolls back for second passes on 4 rollers.

FOR SALE OR RENT AT YOUR NEARBY JACKSON DISTRIBUTOR
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LUDINGTON, MICHIGAN

The guard rail held because it's steel

Steel guard rail is made *and tested* for a wide margin of safety. When this heavyweight plowed into the Bethlehem guard rail along the Southeast Expressway near Boston, the rail held and prevented the truck from rolling down a bank onto a highway below. Thanks to the strength of steel, this accident was not as tragic as it might have been.

Galvanized Rail Cuts Maintenance

Today Bethlehem steel guard rail comes galvanized. The protective coating holds maintenance to a minimum, and gives many years of service.

High Strength for Maximum Protection

Bethlehem beam guard rail has the ideal combination of high strength and low maintenance. That's why Bethlehem steel guard rail protects literally thousands of miles of the nation's roads. Send for our free booklet that describes beam guard rails in detail. Just write to the nearest Bethlehem sales office, or direct to us at Bethlehem, Pa. Ask for Booklet 514.

Steel

for Strength
. . . Economy
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ROADS AND STREETS AUGUST, 1960

HIGHWAYS • BRIDGES • AIR FIELDS • HEAVY CONSTRUCTION

FRONT COVER SCENE

Lima Super Roadpacker follows outsize spreader in streamlined subbase spreading procedure, Ohio Interstate Route 1 job. See page 34.

Accepted as Controlled Circulation Publication at Milwaukee, Wisconsin. Published monthly. Subscription $6.00 per year ($7.00 foreign.) Form 3579 requested to be returned to Gillette Publishing Company 22 W. Maple St., Chicago.

ROADS AND STREETS

Devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; the construction and maintenance of airports. Represents 68 years of continuous publishing in the highway field; combined with Engineering and Contracting and Good Roads Magazines, established in 1892.

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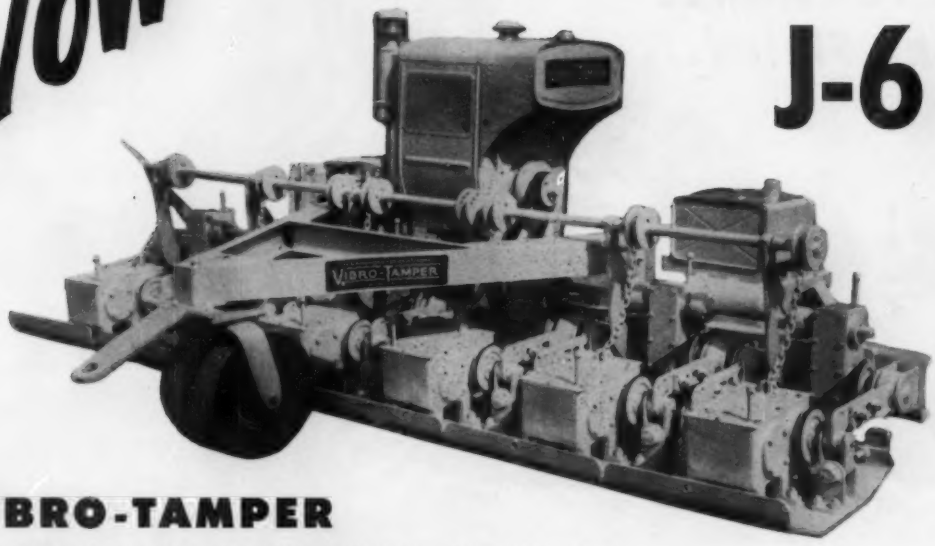

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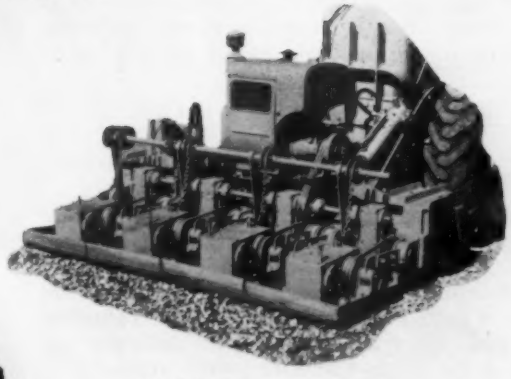
This new versatile model J-6 can be towed to and from the job or while compacting, it can be front mounted on any standard tractor shovel that has a minimum lift capacity of 6,000 lbs. Model J-6 is low in price with high production capacity due to its wide working width of up to 13'2".



Model J-4
Front-mounted

Model J-4 has the same high-powered vibrating-tamping blow of over 10,000 lbs. per shoe as that of model J-6 and model VT6-4. This model has a working width of up to 8' 6".

Model VT6-4
Self Propelled

This model is "Performance Guaranteed" as are our other fine models of Vibro-Tampers. Develope higher densities on deeper lifts with less passes than any other vibratory or static weight compactors now manufactured.

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PROPER *Pre-Shipment* TESTING *Assures* PROFITABLE PERFORMANCE *in the Field....*

IN addition to undergoing exacting tests for mechanical operating efficiency, each GALION Motor Grader, before shipment, receives a thorough engine operation and analysis check on a Clayton Dynamometer.

As a result downtime in the field, due to "new equipment" adjustments and tuning, has been reduced to a negligible point.

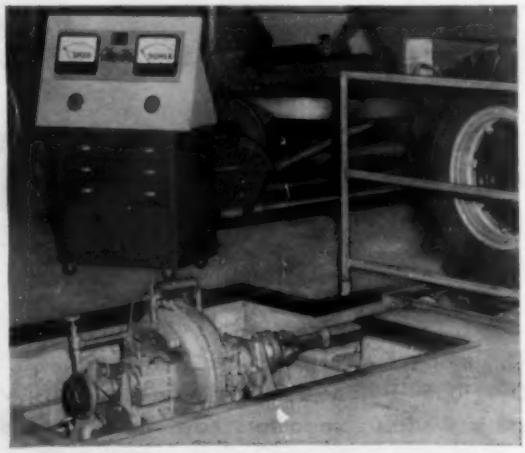
The tests and adjustments are made according to scientific standards. Guesswork, opinions and uncertainties are eliminated. You are assured a grader on which all mechanical parts function properly and the engine delivers top horsepower and speed with utmost fuel economy.

The grader is first tested and adjusted in its highest gear at full throttle for smooth operation with no load. Next the road speed and horsepower are checked under a full load condition. The Dynamometer operator easily controls the load or changes it at will by two remote control buttons.

Speed and torque measurements are electrically integrated, permitting horsepower readings to be shown directly on a large meter without computations being necessary. A matching electric meter shows road speeds in mph regardless of the tire size or rear axle ratio.

For profitable performance — buy GALION! See your Galion Distributor or write direct to The Galion Iron Works & Mfg. Company, Galion, Ohio, U. S. A.

After an initial warm-up period, the grader is moved into place with its tandem drive wheels resting on the Dynamometer testing rolls.



Working conditions are simulated by imposing loads on the Dynamometer rolls thru a closed hydraulic power absorption system.

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The modern Allis-Chalmers HD-16 crawler tractor has the horsepower, weight and drawbar pull needed to handle most tractor jobs on your big spreads. With it, you stay in the same horsepower class as the biggest tractors available a few years ago and save the extra cost of moving up to "extra big" machines.

Look at the HD-16 . . . watch it work . . . compare it to any other crawler and you'll be convinced that, dollar for dollar, you can't buy a bigger producer. Here is an up-to-date power package that converts up to 150 hp at the flywheel to as much as 60,000 lb of drawbar pull. With bulldozer, more than 19 tons of "live-action" weight go to work moving material more profitably than any of your older "big" tractors.

With today's HD-16's, you maintain the power balance of your spread and add greater ease of operation and maintenance that keeps building production

. . . move ahead with

IN 150-HP CLASS

for you. Whether you are replacing outmoded tractors or moving up to more power, you will find it to your advantage to check the tremendous working range of the low-cost, big tractor—the Allis-Chalmers HD-16. See these advantages in action: *industry's healthiest engine . . . toughest track ever built . . . torque converter or all-gear drive . . . permanently lubricated truck wheels, idlers, rollers with tapered roller bearings.* Call your Allis-Chalmers construction machinery dealer for a demonstration. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

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power for a growing world

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LUBE LOGIC

Five tips to

Texaco "lay-away plan" protects exterior of idle equipment

Equipment that won't be needed for a while is sometimes simply parked somewhere so nobody will fall over it. Well and good, but not enough—because rust and corrosion account for almost half of what you spend on equipment maintenance. Here's a 6-step program that will keep idle equipment in cracker jack shape no matter how long it's out of use, or where it's stored. The basic ingredient is Texaco Rustproof Compound L—a remarkable product that keeps rust from starting, and acts to loosen rust that's already on the equipment.

Before applying Texaco Rustproof Compound L, make sure all exterior surfaces are clean and fairly dry.

Coat all adjustment bolts and other exposed threads with Rustproof Compound to facilitate removal or adjustment.

At temperatures of 65° or more, Texaco Rustproof Compound L can be applied to smooth accessible surfaces by brushing.

At temperatures below 65°F, or for inaccessible and complicated areas, spraying is the best way. You can thin the Rustproof Compound to a sprayable consistency by adding naphtha to form a 10 to 50% solution. Add the naphtha slowly to the compound and stir vigorously so the whole batch is the same consistency.

Apply tags at conspicuous points on the equipment describing the rustproofing measures that have been taken.

Thoroughly lubricate all equipment before storage.

Starting up equipment after storage

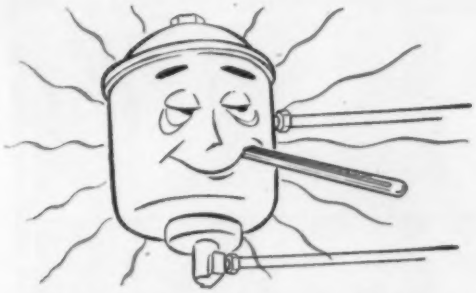
In most cases it's not necessary to remove Texaco Rustproof Compound L. You should, however, remove it from surfaces that will come into contact with personnel (such as ladders, seats and handles) and from surfaces that are heated to high temperatures when the equipment is operated.

Since Texaco Rustproof Compound L is *not* a lubricant, all working surfaces and lubrication fittings should be wiped clean before use, and the correct lubricant should be applied before starting up.

Thicker oil won't stop gear-case drooling

You can't fix leaking seals on a gear-case simply by switching to a heavier-grade gear lubricant, because in gear cases carrying heavy loads, the thicker oil simply increases gear-case temperature, which thins out the oil and it starts leaking again. Sometimes, however, foaming and leaking of gear-case lubricant indicates that the oil level is too high. By keeping vents open and keeping the oil at the recommended level, you prevent build-up of pressure which would cause leakage.

trim maintenance costs



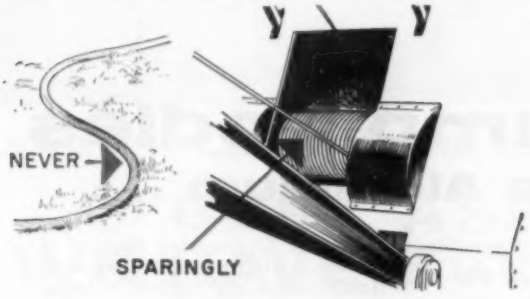
A filter that's working runs a temperature

Oil filters last so long these days it's sometimes hard to say when they were last changed. But they're so important to engine performance that it's essential that you know whether they're too full to filter right. Here's a simple way to find out.

A filter that's working will be as warm as the engine oil. If the filter on a fully warmed-up engine remains cool to the touch, it's a safe bet that it's too clogged up to let any oil through. Just to double-check, tap the filter case sharply. A metallic ringing sound means the cartridge is still in good shape. A soggy thud often means that the filter is loaded. Top mileage for even the best filter is 6,000 miles, never more.

Crawler treads are happier dry

There are few places where good lubrication is more important than in track-roll bearings, but make sure you don't lubricate the crawler treads themselves in a burst of enthusiasm. The pins that connect the links of crawler treads are designed to operate without lubrication, because dirt or other abrasives would act as a lapping compound in service. Result: much shorter service life for the track. Moral: if you don't want to lap your crawler link pins, don't oil them.



How often should you lubricate wire rope?

How much lubrication is good for wire rope and cable depends mainly on how it's used. Cables that are dragged in dirt shouldn't be lubricated at all. Oil simply holds the dirt where it can work into the strands and cause rapid wear. Cables that are wound on drums equipped with clutches should be lubricated sparingly to prevent fouling the clutch faces with lubricant. With other wire ropes, apply Texaco Crater A every 10 to 100 hours as necessary to avoid dryness. Be sure to clean the rope before adding new lubricant.

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Every month or so we'll bring you a batch of "sleepers," little angles, so easy to overlook, where big savings in money and time can be made. But month in, month out, your local Texaco Lubrication Engineer is the best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control."

Texaco Inc., 135 East 42nd Street, New York 17, N. Y.

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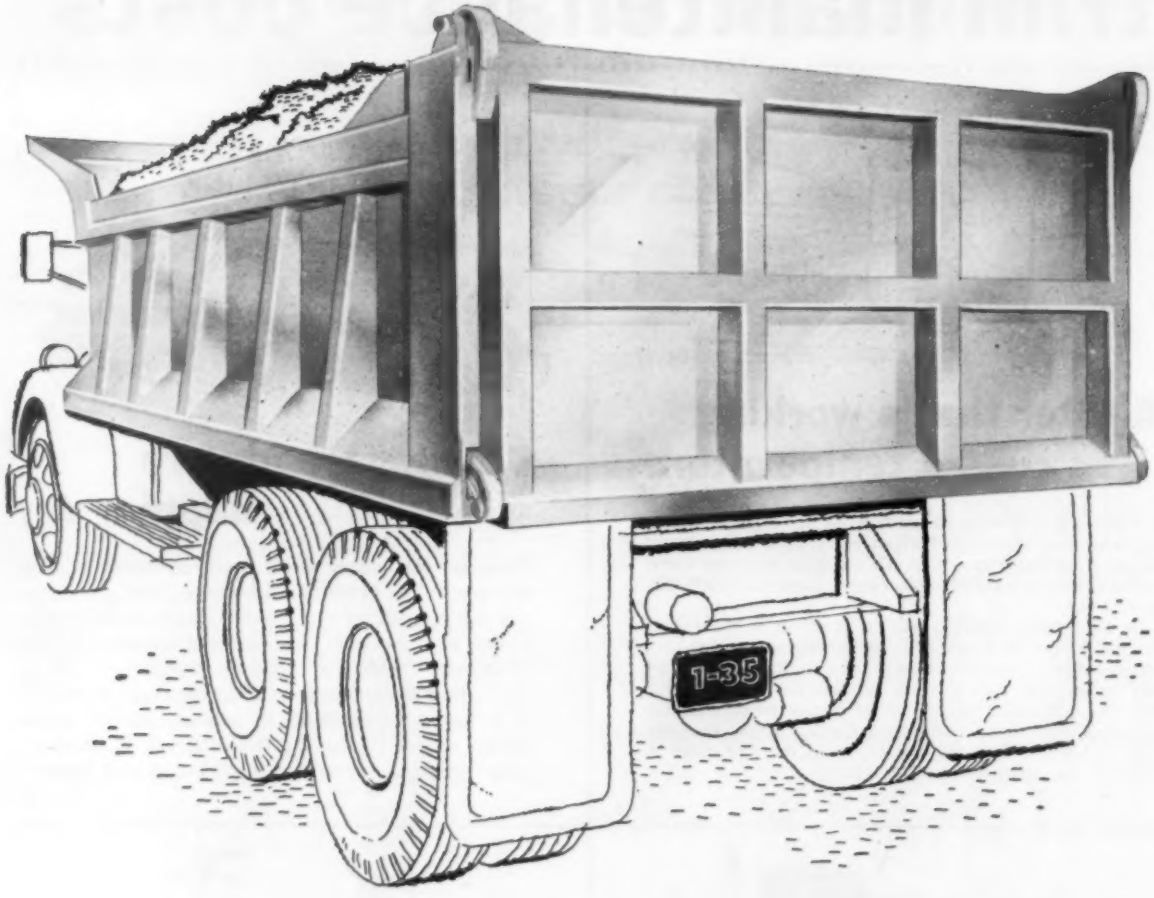
Get on the road with Bigger Payloads...



Aluminum Dump Bodies
made with Reynolds Aluminum

Dump bodies, made with rugged, lightweight, rustfree Reynolds Aluminum, are an investment in extra earning power for you. Before you purchase another dump unit, investigate these money-making advantages of aluminum—

● More Payload
An aluminum dump body weighs approximately one-half that of a steel unit with equal capacity. This means bigger dump bodies are possible . . . you get more payload every trip carrying more material—less deadweight. Plus, you get better tire and gas mileage.

● Faster Work Cycles
Whether you're hauling sand, gravel, rock, crushed stone, shale or dirt, loads free and dump quickly, easily—you get faster work cycles.

● Longer Life—Minimum Maintenance
Rugged aluminum alloy construction can withstand the shock loading and abrasive wear of hauling service—and aluminum can't rust. Aluminum is practically maintenance free—never needs painting. A simple washing cleans an aluminum dump body thoroughly.

Aluminum dump bodies can offer you all of these money making advantages—more payload—longer life—maximum freedom from maintenance.

Reynolds Engineering Service is working with manufacturers of dump bodies and trailers to bring you more profitable hauling units.

Write to Reynolds for the names of manufacturers building dump bodies with *Reynolds Aluminum, P.O. Box 2346-VR, Richmond 18, Virginia.*

Watch Reynolds TV Shows: "Bourbon Street Beat" and "Adventures in Paradise"; and, resuming in October, "All Star Golf"—ABC-TV

REYNOLDS ALUMINUM

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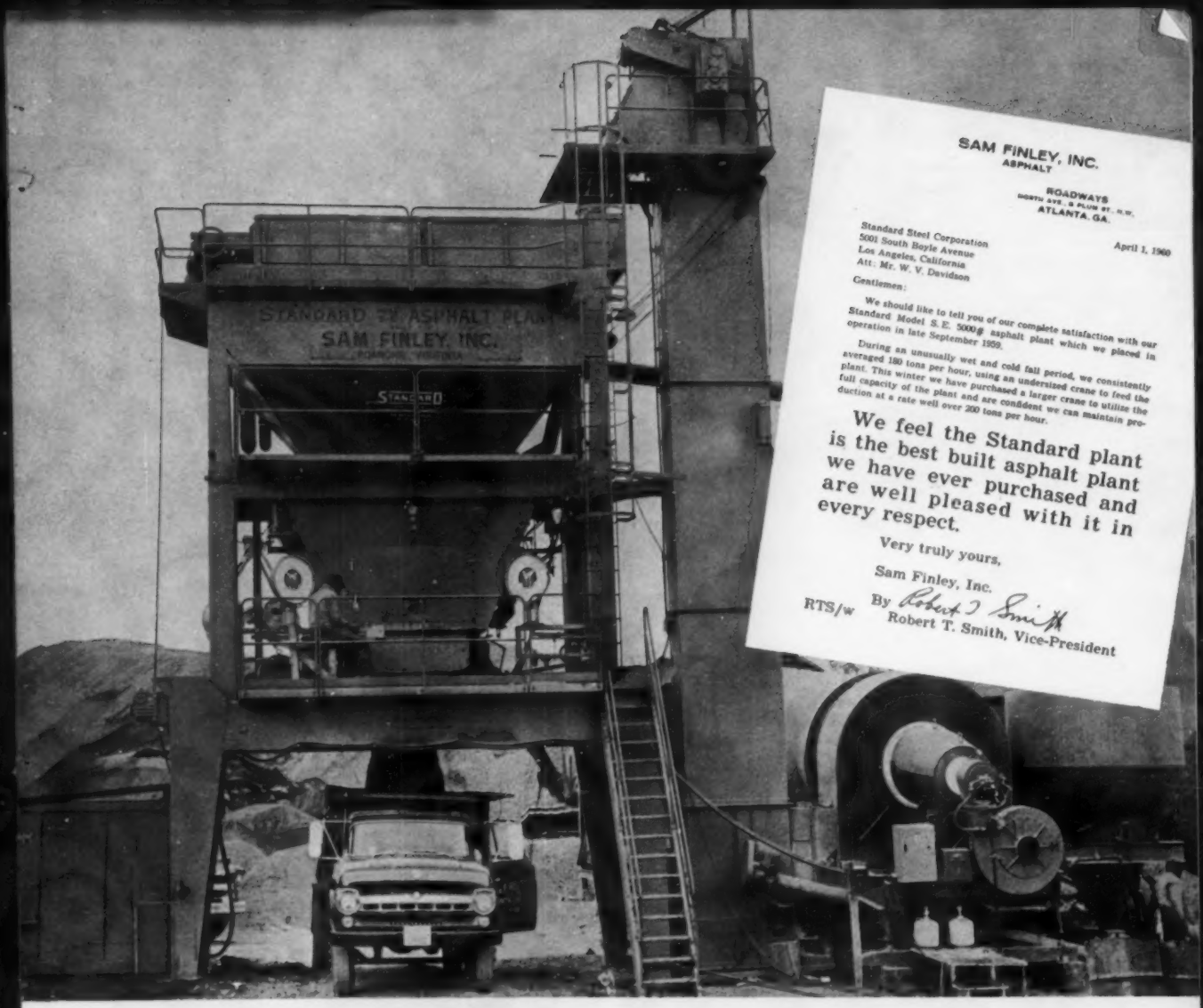


SAM FINLEY, INC.
ASPHALT
ROADWAYS
NORTH AVE. & PEACHTREE ST., N.W.
ATLANTA, GA.

Standard Steel Corporation
5001 South Boyle Avenue
Los Angeles, California
Att: Mr. W. V. Davidson

April 1, 1960

Gentlemen:

We should like to tell you of our complete satisfaction with our Standard Model S.E. 5000# asphalt plant which we placed in operation in late September 1959.

During an unusually wet and cold fall period, we consistently averaged 180 tons per hour, using an undersized crane to feed the plant. This winter we have purchased a larger crane to utilize the full capacity of the plant and are confident we can maintain production at a rate well over 200 tons per hour.

We feel the Standard plant is the best built asphalt plant we have ever purchased and are well pleased with it in every respect.

Very truly yours,

Sam Finley, Inc.

RTS/w By Robert T. Smith
Robert T. Smith, Vice-President

SAM FINLEY, INC. says:

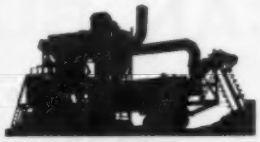
"BEST ASPHALT PLANT WE HAVE EVER PURCHASED"

This revolutionary new STANDARD Model S-E 5000 pound self-erecting, self-contained fully portable Asphalt Plant can be wheeled to the job-site, completely set up *without the use of a crane*, and producing hot mix within 48 hours! Manufactured in 4000, 5000, and 6000 pound batch capacities.

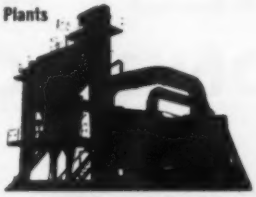
PUSH BUTTON ERECTION — Entire mixing unit is *automatically* raised into operating position.

STANDARD
ASPHALT PLANTS

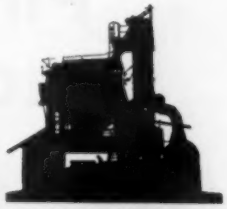
STANDARD / Complete line of Asphalt Plants 2000 through 8000 pound capacity.



Model T-M • Trailer-mounted, self-contained.



Model R-M • Semi-portable and stationary



Model S-E • Self-erecting, fully portable.

STANDARD STEEL CORPORATION *Manufacturers of: Asphalt Plants • Rotary Dryers • Kilns • Coolers • Cryogenics*

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FINEST MOTOR GRADERS MONEY CAN BUY!

Now choose from 9 Austin-Western models to match weight and power needs for any job—16,000 to 30,000 lbs., 102 to 165 hp

Austin-Western motor graders are designed and built to do more different kinds of work faster, and more profitably for *you*, than any other grader of comparable weight and horsepower! We can prove this.

Available in 4-wheel Pacer or 6-wheel Super series. The A-W line features exclusive A-W all-wheel drive and all-wheel steering for unequalled power, precision and maneuverability.

Bulldozer, scarifier, V-plow and wing, reversible plow and roller attachments also available.

Get all the facts and figures on the Power Graders that pay big dividends day after day—year after year. See your Austin-Western distributor or write us.

Austin-Western CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.

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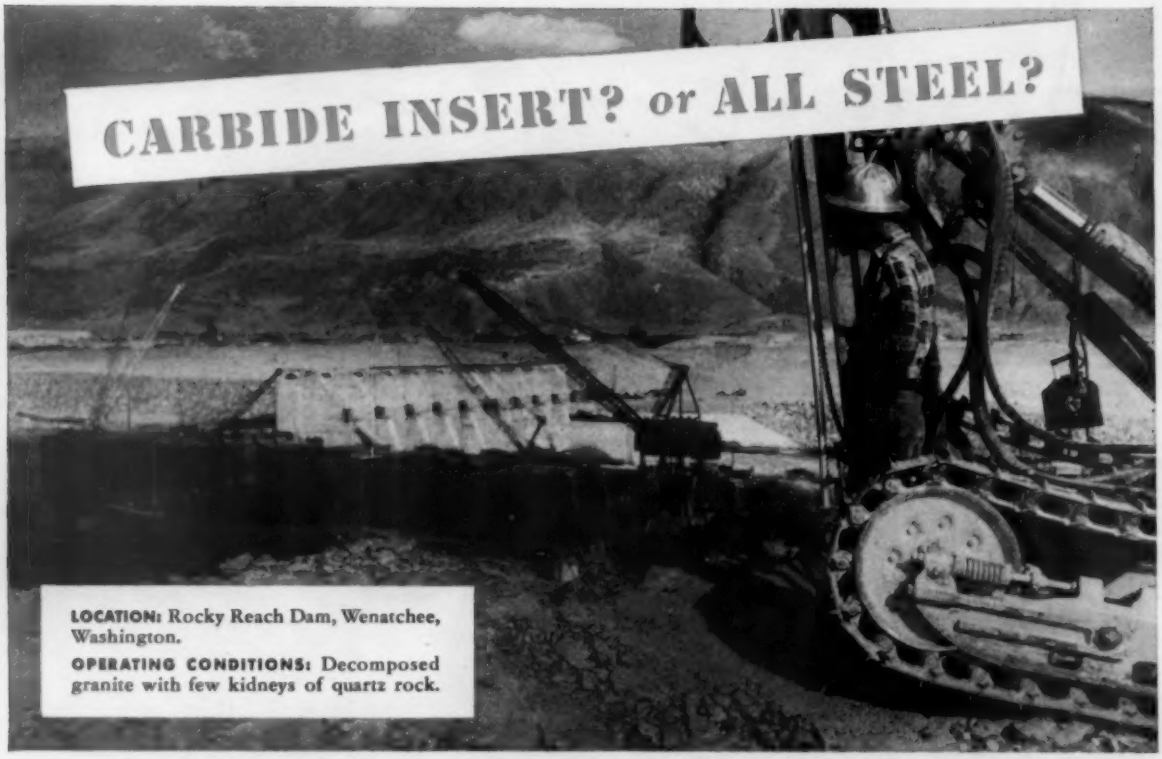

"We drill 1400 to 2000 feet of blast hole per bit with TIMKEN® carbide insert bits"

...Reports Goodfellow Brothers, Inc.

DRILLING to relocate the Great Northern Railroad and Highway near Wenatchee, Washington, Goodfellow Brothers, Inc. selected Timken® carbide insert bits to drill blast holes in the decomposed granite and kidneys of quartz rock. Regrinding both gauge and flutes, they got 1400 to 2000 feet of blast hole from every bit.

That's the kind of performance you get with Timken carbide insert bits when conditions call for them. Their five front holes and deeper wing clearance help clear chips faster. You drill rock instead of chips.

But carbide insert bits may not always be your best bet. In ordinary ground, you'll save more with Timken all-steel bits. With correct and controlled reconditioning, they give you lowest bit cost per foot of hole when you can drill out full increments of steel.

But whatever your drilling conditions and whatever type of bit you use, your drillers will save time and you'll save money with Timken bits. They're all interchangeable in the same thread series. Your drillers can change bits as fast as the ground changes—without changing drill steels.

All Timken bits are made of Timken electric furnace fine alloy steel. We're the only American maker of removable rock bits who takes that extra step. And you get extra protection from a special shoulder union that protects threads from drilling impacts.

Get the right and most economical bit for your drilling jobs. Call or write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable: "TIMROSCO".

Timken threaded all steel multi-use rock bit

Timken threaded carbide insert rock bit

TIMKEN® ***your best bet for the best bit for every job***

removable rock bits

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ROADS AND STREETS
Sixty-Eight years of Editorial Leadership

Washington News Letter

By Duane L. Cronk, Director, Highway Information Services, Inc.

August 10, 1960

Someone remarked that the major speaker at meetings of state highway officials last month turned out to be somebody nobody knows - a Mr. Karl Detzer, whose slam-bang article in the Reader's Digest last month has the highway fraternity in a slow burn.

The engineers have struck back vigorously, with long letters of rebuke to the magazine which reaches millions of Americans. The Bureau of Public Roads, also, has compiled a 14-page point-by-point rebuttal of the article, calling it misleading and inaccurate.

Mr. Detzer charged that the highway program is a huge, grossly mismanaged mess - a rat-hole down which millions of dollars are being poured without proper results. He cited almost every known irregularity dredged up over the last four years as evidence of widespread graft and corruption.

No rebuttal, however well it is documented, can quite catch up to the wave of public opinion formed by such an attack. The states, the Bureau, and the industry can only hope that its investments in public relations during the last four years have built up a reservoir of good will and understanding which will offset it. A good question for all of these organizations to ask themselves might be: "How many newspaper and magazine editors - local and national - have jumped to the defense of the engineers because they know from insight we have given them that 'it just ain't so'?"

* * *

A select list of construction contractors will have an opportunity to speak their mind on Uncle Sam's rules on equipment depreciation allowances. The Treasury Department last month launched a survey of American businesses, including 300 construction firms, to determine if the tax men should allow higher depreciation on equipment as a legitimate cost of doing business. Both Vice President Nixon and Nelson Rockefeller have suggested that under present rules, not enough is allowed for wear and tear. They favor more liberal allowances as the right way to encourage investment and foster economic growth. A number of contractors are expected to agree.

More than 11,300 contractors are in business for state highway work and currently eligible for bidding on state road and bridge jobs, the BPR has found. Bureau officials perused the pre-qualification files of the 50 state highway departments in their first comprehensive survey of the roadbuilding industry for many years. Here are the highlights of the study:

The total of 11,300 includes contractors capable of performing all types

(continued on next page)

of construction as well as those which specialize in some phase, such as grading, paving, drainage structures, bridges, sign erection, landscaping, and other such items.

The great majority - 85% - are eligible to bid in only one state, and presumably may be classified as small business. Some 919 firms - 8% of the total - are prequalified in two states and another 330 - 3% - can bid in three states. The big boys in the business are represented in the number - 461 - eligible to cast about for work in more than three states (seven states on the average).

The roadbuilding industry is in a constant state of change, the BPR said, because of newcomers to the field, mergers, shifting of activity to and from other construction fields, and failures.

* * *

Material producers will be interested in a new re-survey of the material requirements of the highway construction program. The BPR's Edwin L. Stern has completed a study of how much steel, portland cement, bitumens, aggregates, lumber, petroleum and other products would be needed for roadbuilding during the next 12 years under present financing philosophy. Also available is a report showing trends in the use of these materials, up or down during the last four years. There are some significant findings here.

The construction equipment industry scored a victory last month with defeat of a bill which would have flooded the domestic market with government surplus machinery now overseas. CIMA and AED united in the fight to prevent what they believed would constitute a wholesale dumping of equipment here.

* * *

How to buy a motor grader . . . The U.S. Bureau of Public Roads has completed an intensive testing of motor graders and developed a new set of specifications to guide federal agencies in the purchase of this kind of machine. The Bureau's Division of Development found that motor graders are classified under such a variety of horsepower ratings that it was necessary to consider a number of other characteristics in addition which determine the work ability of the machine "at the blade." These include weight distribution, general machine balance, transmission type, and gear train efficiency.

"The only practical way to integrate all these factors into a performance rating was to measure the tractive effort or blade pull available at the moldboard - the working end of a motor grader - for a reasonable ground speed range," the BPR researchers decided.

Under the federal specification, tractive effort requirements will be based on a curve drawn through the maximum power points for a speed range of from 2 to 10 mph, the speeds at which most roadbuilding jobs are accomplished (also snow plowing). The specification will require, specifically, the designation of a basic horsepower rating at 3 mph. A weight requirement will be included, with the specification that weight distribution for tandem drive graders will put 65-75 percent of the total weight on the drivers.

Other performance requirements cover minimum lean of front wheels, maneuverability of the moldboard, engine cooling system efficiency, brake performance, turning radius, and overall production capacity on typical roadbuilding operations.

CONTRACT AWARDS MARKET SNAPS BACK

Some fast shuffling of federal-aid funds by the Department of Commerce last month has lead highway industry observers here to take another look at their forecasts for state highway construction awards this calendar year. Their consensus - marked by an air of caution - is that contract awards are quite likely to hit $3.8 billion in calendar 1960, only 5% under the record 1958, and a healthy 19% over 1959.

This is good news to an industry which suffered a demoralizing cut-back in work the last half of 1959 and has lived in an atmosphere of uncertainty since then. If true, it means that 1960 will see an almost complete recovery of the momentum of the National Highway Program. Specifically, here is what is happening . . .

State contract awards (for federal-aid ABC, Interstate, other state work, and toll road lettings) have been climbing out of the 1959 trough at a healthy pace for the last six months. During this period, they have built up to $1,785 million. This is more than any other six-months period in history, with the exception of that high-volume second-half boom in 1958.

During the next six months, the experts here say, awards will go even higher. The states can advertise at least $2,200 million worth of new work between July 1 and December 31. Predictions are that they will come close to that, say $2,000 million.

Here's the outlook on state construction contract awards, compared to previous years:

Calendar 1958		Calendar 1959		Calendar 1960	
First Half	Second Half	First Half	Second Half	First Half	Second Half
$1,729	$2,326	$1,780	$1,457	$1,785	$2,000
Total: $4,055		Total: $3,237		Total: $3,785	

Actually a freakish series of maneuvers by the Department of Commerce has combined to provide this kind of outlook for 1960. First, the Department accomplished almost all of the cutback required to protect the Highway Trust Fund in the last half of '59, then permitted the state highway departments to loosen the purse strings in the first six months of this year (two-thirds of the obligations to be permitted in fiscal 1960 were reserved for the first half of this year). Second, the Secretary has now decided to let the state highway departments obligate all of their last-half fiscal 1960 funds during the next 90 days (or rather, July 1 to Sept. 30). The result is that federal-aid funds have been thrown into this construction season from both directions. All of which bears out that the highway program is bound to be an up-and-down proposition, with temporary drops but quick recoveries as administrators and the general public are reminded that they can't drive those automobiles and trucks so well without a road to travel on.

How Recovery of State Contracting Market Will be Bolstered by Surge in Federal-Aid Funds This Calendar Year

The foundation under the rise in construction contracts now under way in state highway departments is a relaxation of the contract controls. In 1959, slightly less than $2.3 billion (in federal funds only) was actually obligated on the Interstate and ABC Systems for right-of-way, preliminary engineering, and construction. But in 1960, the states may put more than $3.2 billion in federal funds to work. Construction will come in for more than 75 percent.

Here's how each state will fare under the new obligations controls schedule:

State	Obligated Calendar 1959	May Obligate Calendar 1960	Increase or Decrease	State	Obligated Calendar 1959	May Obligate Calendar 1960	Increase or Decrease
Ala.	$ 52.3	$ 61.3	17	Mont.	$ 20.7	$ 53.5	158
Alaska	13.5	44.9	234	Nebr.	27.4	40.6	48
Ariz.	37.8	38.4	2	Nev.	17.9	26.7	46
Ark.	33.2	31.7	- 2	N.H.	13.3	15.8	18
Calif.	141.5	284.2	101	N.J.	54.7	102.9	88
Colo.	20.8	36.9	78	N.Mex.	22.8	43.9	93
Conn.	47.0	37.1	- 21	N.Y.	133.0	163.3	23
Del.	5.2	18.9	264	N.Car.	51.9	46.1	- 11
Fla.	58.7	67.3	15	N.Dak.	22.7	22.1	- 4
Ga.	55.9	76.7	35	Ohio	78.9	164.1	109
Hawaii	2.7	6.1	124	Okla.	23.4	39.0	65
Idaho	17.4	32.8	88	Ore.	46.4	52.0	12
Ill.	136.1	138.2	2	Penn.	37.6	141.3	277
Ind.	65.4	93.0	44	R.I.	11.7	12.6	8
Iowa	43.7	42.1	2	So.Car.	33.7	31.8	- 6
Kans.	28.0	41.7	50	So.Dak.	23.4	31.3	27
Ky.	36.2	59.7	66	Tenn.	43.5	89.2	105
La.	57.3	71.7	25	Texas	156.4	146.6	- 16
Maine	14.0	18.4	32	Utah	31.3	30.4	- 9
Md.	21.6	62.1	189	Vermont	27.8	19.6	- 34
Mass.	68.0	85.3	26	Va.	44.1	117.6	164
Mich.	96.8	124.6	26	Wash.	42.1	54.3	29
Minn.	59.2	61.7	3	W. Va.	30.1	36.8	22
Miss.	38.9	35.2	- 9	Wis.	44.1	47.3	7
Missouri	67.3	92.7	38	Wyo.	18.5	33.2	80
				D.of C.	17.0	25.4	51
				Puerto Rico	6.5	7.0	8
				TOTAL	$2,299.4	$3,257.1	42

Note: Funds above (in millions) are federal funds only, no state matching, and are for federal-aid systems only. Sums shown on preceding page are of all state highway department and toll road authority awards on all state systems.

B.F.Goodrich helps change the face of a river

40 TONS OF CONCRETE ride to the bottom of Barkley Lock on B.F.Goodrich Rock Service tires. These gigantic tires (over 6 feet high) are built with B.F.Goodrich Flex-Rite Nylon cords that withstand double the impact of ordinary materials, resist heat blowouts and flex breaks. The new B.F.Goodrich Cut Protected tread compound guards against the kind of severe rock cuts and chipping found on such projects as Barkley Lock.

Hundreds of B.F.Goodrich tires—and other products—speed development of Cumberland River Basin

TWENTY-FOUR miles east of Paducah, Kentucky, they're changing the face of the Cumberland River. Here Barkley Dam will rise to a height of 155 feet, forming 62,000-acre Lake Barkley—key units in the development of the Cumberland River Basin.

This $182-million project (including construction of a lock, power plant and canal) will provide flood control, improve navigation and produce 600-million kilowatt-hours of energy a year. The completed lock will have a chamber 110′ x 800′ and a lift of 52′ to 57′. Five outmoded locks will be eliminated.

On the job: Tecon Corporation, general contractors of Dallas, Texas, who have chosen B.F.Goodrich tires, industrial products, protective clothing and footwear 100%. BFG Special Contractor's Representatives work hand-in-glove with Tecon on all phases of Barkley Construction.

This B.F.Goodrich report continues ▶

Wherever you look at Barkley Dam you'll see B.F.Goodrich tires on the job

HELPING Tecon Corporation meet the challenges of the $182-million Barkley Dam project are a corps of B.F.Goodrich on-the-scene specialists and scores of different B.F.Goodrich products.

Giant BFG Rock Service tires haul concrete and rock. Rock Logger tires deliver fly ash. B.F.Goodrich All-Purpose tires support a "cement hog." Traction Express and Power Express tires bring in supplies. Power Grader and Universal tires move earth.

This is only the beginning. You'll find B.F.Goodrich hose delivering air, water, even dry cement. BFG V-belts drive pumps, crushers and vibrator screens. Conveyor belts carry sand and aggregate. And the 700 Tecon men on the project wear B.F.Goodrich protective clothing and footwear.

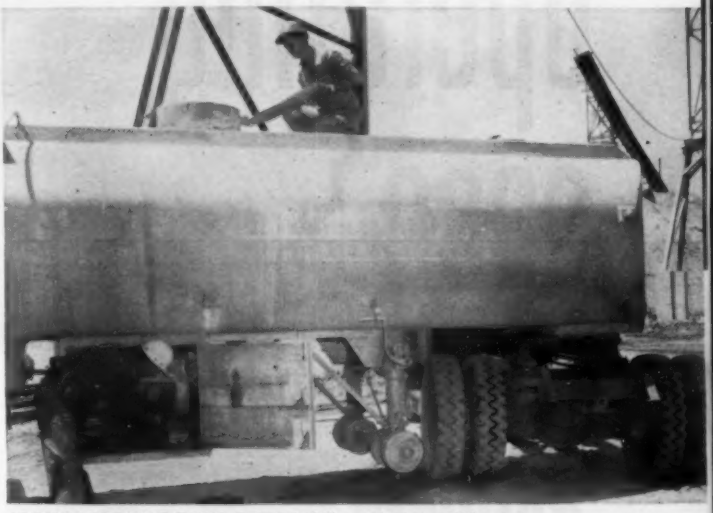
To keep the whole job humming, B.F.Goodrich provides special maintenance and service facilities, all part of the new B.F.Goodrich Unified Contractor Program. If *you* want to cut the cost of doing business, it will pay you to talk to B.F.Goodrich. Your Smileage dealer is listed in the Yellow Pages. Or write *The B.F.Goodrich Company, Akron 18, Ohio.*

Specify B.F.Goodrich Tubeless or tube-type tires when ordering new equipment

B.F.Goodrich Smileage!

AT BARKLEY LOCK, workman rough up concrete surface for new pour. BFG hose carries air and water under high pressure. Yellow rainsuits and footwear protect men. B.F.Goodrich Unified Contractor Program provides Tecon with everything from tires to boots to belts.

CONSTANT TIRE INSPECTION by B.F.Goodrich on-the-job service men avoids delays, lowers operating costs. Servicemobile is equipped with all the latest power tools. Complete stock in B.F.Goodrich Tire Service Building (built for this project) includes BFG batteries used in all Tecon motorized equipment.



SPECIALLY BUILT TANK TRUCK delivers 30 tons of fly ash. Tecon Corp. chose rugged B.F.Goodrich Rock Logger tires because the extra-thick tread defies rock cuts, gives positive traction in forward or reverse. 125 pieces of equipment work on Barklev Dam which will have an overall length of 10,020 feet.

◀ **24 HOURS A DAY, 6 DAYS A WEEK,** trucks haul tons of rock out of Barkley Dam excavation. Haul roads are steep and strewn with abrasive rock. Yet B.F.Goodrich Rock Service tires are so rugged that many actually can be retreaded up to 3 times on this operation. Note BFG Servicemobile, at work as usual.

B. F. GOODRICH CONVEYOR BELTS AND HOSE arrive at Barkley Dam on tractor-trailer equipped with Power Express and Traction Express tires. (Users call the Traction Express the "100,000-mile tire.")

B. F. GOODRICH ALL-PURPOSE TIRES (as at home in the rough as on the highway) give mobility to "cement hog" that carries dry cement to batch plant. BFG contractor's program helps Tecon simplify purchasing, eliminate confusion, cut equipment and operating costs.

OFF-THE-ROAD TIRES BY B.F.Goodrich

. . . for more details circle 307 on enclosed return postal card

How Payscraper®

"automotive" operating ease highballs your dirt-on-fill delivery

You won't need stunt-car "jockeys" or muscle men to give you the dirt-on-fill bonus the 375-hp International Payscraper rigs can deliver! Almost all the danger, hard work, and rump-bumping of rubber-tired rig operation is engineered out of Payscraper models. And an exclusive combination of operating ease, safety, and comfort features is engineered in!

Push-button, finger-tip ease! Your operator simply pushes a button to direct-start the DT-817 Diesel and ready 375 high-torque hp to give a cycle-speeding Payscraper rim-pull of 60,000 lbs.; plus time-saving, "no-lag" control power!

Your operator pulls directly out of 90° turns—with 34-cu. yd. heap loads on either the 2-axle "295" or 3-axle "495." Ample power and traction team with the exclusive International tandem-pump, rack-and-pinion steering to give positive, right-angle turning with full power. This finger-tip controlled system leaves the "steering feel in the steering wheel," even at the top 33.5 mph speed.

For fast, positive dumping, the high Payscraper apron lift gives you a "barn-door-like" opening up to 94 inches! The positive-acting Payscraper ejector mechanism is powered by the International shock-absorbing, planet-type Cable Control Unit. One cable drum of this simple, fast acting unit actuates apron and ejector; the other drum positions the bowl to control spreading action. Shown, the 3-axle "495" fast-dumping on the fill!

He power-shifts the Payscraper, up or down almost like easing his car into automatic drive. The 4-speed, planetary-type, torque-converter transmission gives him load-speeding *automatic* direct-drive lock-ups in second, third and fourth gears!

Your operator power-steers the 150,000-lb. loaded Payscraper with automotive-like ease. He commands the exclusive "mind-reading" International rack-and-pinion, tandem-pump steering system—plus 3-degree forward spindle pitch that improves scraper balance and prevents "bucking bronco" nose-downs in high-speed turns!

He controls 34 cu. yd. loads on hills, fills, turns—anywhere—with positive-acting Payscraper air brakes. He power-controls all Payscraper dirt-handling actions, finger-tip easy, with the International PTO-driven constant running cable control unit!

And he rides in a foam-cushioned, 15-adjustment, bucket seat that gives positive, selective ride-control to match luxury car comfort.

See for yourself what it means, in highballing your dirt-on-fill delivery, to arm your operators with Payscraper advantages. Prove what happens when you give them the highest power-to-payload punch of the 34-cu. yd. rigs—along with Payscraper operating ease and safety. Choose the 2-axle "295," or 3-axle "495" and let your International Construction Equipment Distributor demonstrate!

. . . for more details circle 315 on enclosed return postal card

Up or down power-shifting—effortless power-steering—fast power control of Payscraper dirt-handling—all help your operator give you fast "kick-outs" and get full pusher hp efficiency. The highest power-to-payload punch of all 34-cu. yd. scrapers helps highball dirt delivery. The planet-powered TD-25 and TD-24 are "pushing" for this fleet of "295's"—building superhighway!

Here's the big torque converter transmission—that helps Payscraper models turn 375 turbocharged hp into industry topping production! Besides providing smooth shifting and speeds for every need, this torque converter gives automatic lockup for direct, load-speeding mechanical drive in 2nd, 3rd, and 4th gears!

International® Construction Equipment

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Ill.
A COMPLETE POWER PACKAGE

Meetings

INSTITUTE OF TRAFFIC ENGINEER—30th Annual Meeting, Edgewater Beach Hotel, Chicago, Illinois; September 12-16.

EIGHTH ANNUAL NATIONAL HIGHWAY CONFERENCE FOR COUNTY ENGINEERS AND OFFICIALS, Sponsored by County Division of American Road Builders Association, Atlanta Biltmore Hotel, Atlanta, Ga.; September 19-21.

ASSOCIATED EQUIPMENT DISTRIBUTORS—Midwest Management Conference, Regions 6, 7, 8 and 9, Drake Hotel, Chicago, Ill.; September 22-24.

THE AMERICAN WELDING SOCIETY—National Fall Meeting, Hotel Penn-Sheraton, Pittsburgh, Pa.; September 26-29.

PRESTRESSED CONCRETE INSTITUTE—6th Annual Convention, Statler-Hilton Hotel, New York, N.Y.; September 27-30.

NINETEENTH ANNUAL SHORT COURSE ON ROADSIDE DEVELOPMENT, Columbus, Ohio, October 4-7.

AMERICAN SOCIETY OF CIVIL ENGINEERS Annual Convention, Statler Hotel, Boston, Mass.; October 9-13.

CANADIAN GOOD ROADS ASSOCIATION—Annual Convention, Toronto, October 17-20.

SOUTHEASTERN ASSOCIATION OF STATE HIGHWAY OFFICIALS, Buena Vista Hotel, Biloxi, Miss.; November 1-4.

NATIONAL SLAG ASSOCIATION—Annual Meeting, Hotel Mayflower, Washington, D.C.; November 3-4.

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS—Annual Convention, Detroit, Mich.; November 27-December 2.

ASPHALT INSTITUTE—Annual Business Meeting, Sheraton Park Hotel, Washington, D.C.; December 5-8.

Fall Welding Meeting

The American Welding Society's national fall meeting is set for September 26-29, 1960, Hotel Penn-Sheraton, Pittsburgh, Pa. Seventeen technical sessions are planned including four sponsored by the American Society of Civil Engineers, two of these being cosponsored by the Column Research Council of the Engineering Foundation. 51 papers will be presented on welded structures; resistance welding, brazing, electrodes and techniques, research and weldability, processes, rebuilding and surfacing, nondestricte testing, missiles, cutting, aluminum, high alloys and fabrication of weldments.

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THE REASONS WHY . . .

- JET SEAL (9015H) has no flow, even at elevated temperatures (200°F).
- Vertical and overhead joints can be sealed without any special preparation.
- JET SEAL will prevent penetration of water into joints.
- JET SEAL is highly resistant to highway salts.
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- JET SEAL has positive adhesion, cohesion, resilience, and ductility at low temperatures (—20°F).
- JET SEAL is quick curing. Construction can be open to all traffic within one hour.

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IDEAL FOR CURB JOINTS—TIGHT SPOTS

With the new COMPACT Applicator (Model X-691-E above), curb joints, wing walls—any tedious sealing problem is solved. Both JET SEAL Applicators offer the highest sealing efficiency, and are the only equipment authorized for placement of Allied JET SEAL.

HIGHWAY ENGINEERS SPECIFY ALLIED JET SEAL

Highway construction engineers the nation over are specifying Allied JET SEAL as the preferred concrete joint sealant. JET SEAL's superior sealing qualities mean time, labor, and money saved during application and through JET SEAL's exceptionally long life.

Listed on the left are some of the reasons why Allied JET SEAL joint sealant specifications have been adopted by these states:

California, New York, Texas, Tennessee, Connecticut, Minnesota.

Allied JET SEAL can solve your concrete joint sealing problems on highways and bridges (including vertical joints). JET SEAL (9015H) is the most efficient concrete joint sealant ever devised.

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New Publications

1960 ARBA Directory of Highway Officials

More than 2,000 names, titles and addresses of administrative engineers and officials in the 50 state highway departments, the District of Columbia and Puerto Rico are listed in the 1960 edition of the pocket-sized directory, "Highway Officials and Engineers."

The directory also lists administrative personnel of the Bureau of Public Roads, the toll roads, and the American Road Builders' Association divisions.

As in previous years, the directory may be obtained for $1 per copy from American Road Builders' Association, World Center Building, Washington 6, D. C.

Steel Tired Rollers

Data on the compaction obtained with these steel tired rollers is contained in Bulletin 246, Highway Research Board, 2101 Constitution, Washington, D. C. Bulletin price, $.80. Article by Charles F. Parker covers roller types and recommendations, as presented in a paper for the 38th Annual Meeting of the Board.

Booklet on Chloride In Secondary Roads

A new booklet on "Progressive Improvement of Secondary Roads," outlines a program for providing hard surfacing on roads rate for paving. It emphasizes the benefits to be obtained from the proper use of calcium chloride in stage construction to accelerate paving roads which now merit a higher type surface.

Single copies are available on request to the Calcium Chloride Institute, 909 Ring Building, Washington 6, D.C.

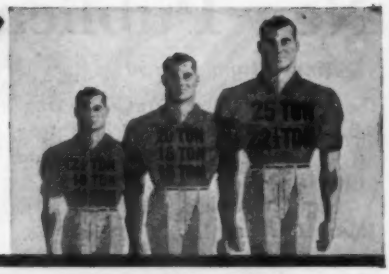
FIELD APPLICATIONS OF SOIL CONSOLIDATION: Time-Dependent Loading and Varying Permeability. Bulletin 248 Highway Research Board, 2101 Constitution, Washington, D. C. Price $0.60.

A paper presented at the Board's 38th annual meeting by R. L. Schiffman; a sequel covering certain specific problems of consolidation as computed by a 1958 extension to the Terzaghi theory of consolidation of fine-grained soils. The computed results enable soil engineers to use the proposed theories in practice.

HIGHWAY BRIDGES: PAINTING AND DECK CONSTRUCTION. Bulletin 243. Highway Research Board, 2101 Constitution, Washington, D.C. Price $.60. This 27-page bulletin contains two papers presented at

Continued on page 32

Only "QUICK-WAY"® Starts at the Top with 3 BASIC MACHINES

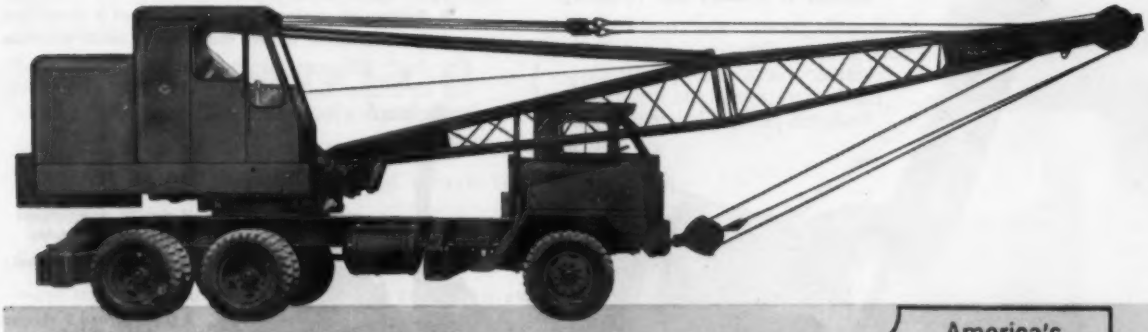


same heavy duty UPPER WORKS in every model of each group

STEPPED DOWN ratings accomplished by proper carriers, smaller engines... LIGHTER COUNTER WEIGHT

Always sound balance, fast smooth operation in every model

"Quick-Way's" 3 FAMILY GROUPS incorporate the latest proven designs and structure so essential in heavy duty truck mounted machines. The structure and design of each model IN ALL 3 GROUPS are so arranged with the proper type and size carriers that balance and low center of gravity is individually engineered into each separate unit. With the exception of carriers, engines, counterweights and variations in application of single or tandem hook rollers, with or without anti-friction bearings, all models in each family group have the same heavy duty UPPER-WORKS as used in the highest rated capacity of the group. As a result there is a "Quick-Way" with a capacity rating to FIT YOUR JOB and YOUR BUDGET.



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City.....State.....

America's 1st Truck Shovel Still In The FOREFRONT In MOBILE CRANE DESIGN

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New Publications

Continued from page 30

the Board's 38th annual meeting which are deemed of special interest to bridge and maintenance engineers:

"Highway Bridge Painting," by John D. Keane, presents a check list of things to avoid in painting highway bridges and some important considerations in painting bridges.

"Smooth Riding Bridge Decks," by Nomer Gray, presents some of the distinctions made in the construction of concrete bridge decks and the construction of concrete pavement on grade.

STATE HIGHWAY ORGANIZATION CHARTS, 1959 REVISION. Special Report No. 53, Highway Research Board, 2101 Constitution, Washington, D. C. Price $1.60. Produced by the Board's committee on highway organization and administration.

1959 ASTM PROCEEDINGS, Vol. 59. Price $12.00. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

This 1,424-page volume records the year's ASTM technical accomplishments, including reports and papers, together with discussions accepted for the Proceedings. It includes the Summary of Proceedings of the ASTM 62nd Annual Meeting (June, 1959) and the Third Pacific Area National Meeting (September, 1959).

There are 71 reports of technical committees which, together with appendices, provide a wealth of useful information, as do 44 technical papers and discussions on a wide variety of subjects pertaining to research and standards for materials. In addition, there are listed all symposia and other special sessions published separately as Special Technical Publications and all papers published in the ASTM Bulletin.

SIGN SUPPORTS: FOUNDATION DESIGN. Bulletin 247, Highway Research Board, 2101 Constitution, Washington, D. C. Price $0.80. This 35-page bulletin contains three papers presented at the 38th annual meeting of the Highway Research Board.

PUBLICATION INDEX: 1956-1959; Highway Research Board, 2101 Constitution Avenue, Washington, D. C. Price $2.00. This 128-page compilation lists hundreds of titles of publications available from the Board on about 150 subjects ranging from accidents to welding.

PHYSICAL AND CHEMICAL PROPERTIES OF CEMENT AND AGGREGATE IN CONCRETE. Bulletin 239. Highway Research Board, 2101 Constitution, Washington, D.C. Price $1.20.

In New Trucks or Old—

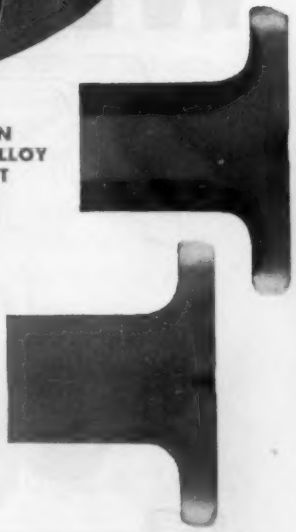
EATON INDUCTALLOY AXLE SHAFTS

LAST 3 to 10 TIMES LONGER

Through billions of miles of heavy-duty service, Eaton Inductalloy Axle Shafts have proved their ability to deliver superior performance. Freedom from break-down—more time on the road, less time in the shop—plus thousands of trouble-free miles added to axle life, mean lower over-all operating cost.

Eaton's exclusive method of dual hardening truck axle shafts produces an extremely hard case extending deep into the material structure, and enables Inductalloy Axle Shafts to handle more work and abuse without fatigue failure.

Eaton Inductalloy Axle Shafts are available not only in new axle equipment, but also as replacements for earlier models. Ask your truck dealer for complete information.



EATON

AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

High-Speed Subbase Placement Method (See Front Cover)

Concrete paving is usually a high-production affair when V. N. Holderman & Sons, Columbus, Ohio, is doing the work. This company set speed records repeatedly in the past ten years, including Ohio Turnpike and later Interstate projects involving daily runs up to 7,000 to 8,000 ft. of 12 ft. and eventually a mile or more of 24 ft. pavement.

Part of a well synchronized paving operation of Holderman is pictured here and also on the front cover. The project is a segment of Ohio I Route 1 near Mt. Gilead. Subbase material being placed as the under-layer for the concrete is Ohio I-22 specification screened gravel.

The first step was to carefully prepare the template grade. Next, as shown, came a precise spread of material, done with a Cat D9 tractor-propelled heavy-duty Blaw-Knox spreader box. This spread was 10 in. compacted thickness by 28 ft. wide, made in only one pass.

Then followed another out-sized machine, a Lima Super Roadpacker which made simple, fast work of the consolidation. This unit with its double row of vibrators in tandem compacted a 15 ft. width in one pass. It traveled at a speed adjusted to the production schedule (when desired, up to 24 mph).

This sequence of equipment focuses on the important detail of securing a pavement support that is uniform as well as properly compacted; and also on the contractor's need to accomplish the result with economy, efficiency and often high speed.

National County Road Conference Program

Members of the Board of County Consultants to the U. S. Bureau of Public Roads will participate in a panel discussion, "Survey of County Highway Problems", at the 8th Annual National Highway Conference for County Engineers and Officials. This meeting is set for Atlanta, Georgia, September 19-21, under the auspices of the County Division, American Road Builders' Association. The Georgia County Commissioners Assn. will be host.

The Consultants, composed of one county highway engineer or official from each of the nine BPR regions will also hold a discussion meeting with officials on matters pertaining to secondary highways during the week.

The panel discussion will include such topics as the impact of the Interstate System on secondary roads, maintenance problems and standards on Federal-aid secondary highways, and the use of Federal-aid funds in acquiring right-of-way.

Other topics on the program include zoning and planning problems affecting highway development, new techniques in highway engineering and construction, drainage problems, accounting practices, and new developments in the fields of equipment maintenance and traffic control.

Hotel reservation forms are now available through Ben F. Ostergren, Managing Director, County Division, ARBA, World Center Building, Washington 6, D. C.

NOW! a Euclid 14-yd.* scraper with all-wheel drive!

TS-14 features that cut dirt moving costs

2 engines — 296 total h.p.

all-wheel drive

NoSpin differentials

2 Torqmatic Drives

converter lock-up

20 yds. heaped (14 yds. struck)

*heaped capacity at 3:1 is 16 yds., at 1:1 slope, 20 yds.

HERE'S BIG NEWS for scraper users. The many cost cutting advantages of all-wheel drive are now available in a medium-size scraper, the Euclid Model TS-14. With Twin-Power and a total of 296 h.p. this new "Euc" has already proved itself an outstanding performer. A one-man, one-machine earthmoving spread, it gets more work done at lower cost than any other scraper of comparable size . . . its high productive capacity brings a better return on investment.

Like the widely used 24 yd. "Twin", this new Euclid has a separate Torqmatic Drive and power train for each axle. It self-loads in practically any scraper material and with a pusher is a big producer on even the toughest jobs. There's plenty of power and traction to pick up a heaped load in a hurry . . . pull out of the cut fast . . . and highball on the haul and return.

The TS-14 works on grades and under adverse job conditions that stall other scrapers. Its ability to do a wide range of work — without pusher assistance — makes it the most versatile scraper in its class. This new "Twin" can lengthen your work season and give you a bidding advantage on that next job. Get the facts and figures from your Euclid dealer. EUCLID Division of General Motors • Cleveland 17, Ohio

Check the advantages of all-wheel drive in this new TS-14 Twin-Power Scraper!

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FOR MOVING EARTH, ROCK, COAL AND ORE

People

Cement Association Names District Engineers

Robert H. Lochow is appointed to succeed Albert L. Blackwell as District Engineer for the Portland Cement Association in New Jersey with headquarters at Trenton. He moves to this assignment from fourteen years with the Association at Seattle, with a consulting engineering background.

Charles H. Knight, Jr., recently with the Association in the Los Angeles area, succeeds Mr. Lochow as District Engineer at Seattle.

HOMER A. HUMPHREY has been appointed district engineer in Southern New England for the Portland Cement Association with headquarters at Boston. He succeeds Malcolm S. Loring, resigned.

Mr. Humphrey has been with the association since 1937 except for military leave during the war, having served as a soils engineer, personnel training manager and recently senior highway consultant and regional paving engineer.

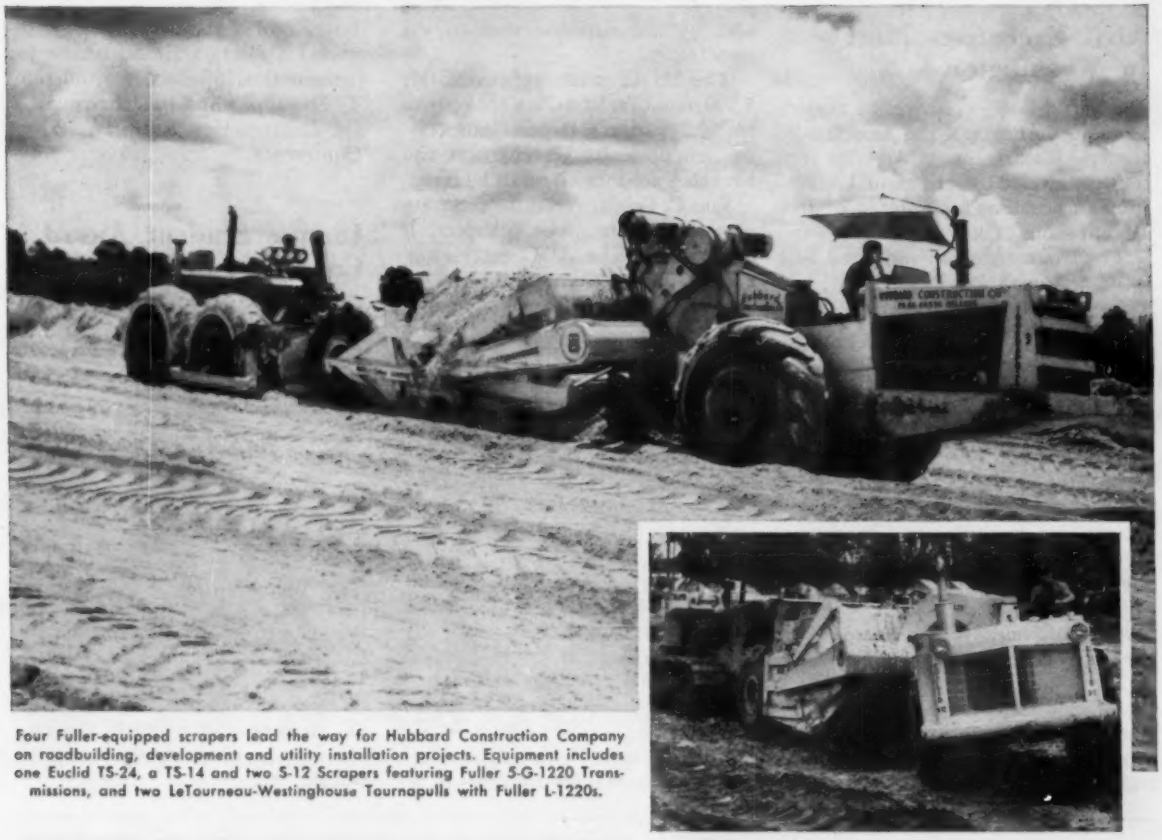
CLAUDE A. ROTHROCK, formerly state planning engineer for the West Virginia state road commission, is returning to the commission to do work on advanced engineering and planning. He had been with West Virginia for 20 years before joining the Ohio state highway department in 1955.

JOHN H. FISK, of Franklin Park, N.J., has been named Assistant to the Secretary of the American Society of Civil Engineers, it was announced by W. H. Wisely, executive secretary. He will work with the Society's network of student chapters and with younger members.

BRUCE D. BENNETT, manager, construction material sales, American Steel & Wire Division, United States Steel, was named president of the Wire Reinforcement Institute at the recent annual meeting of the U.S. and Canadian trade association of welded wire fabric manufacturers.

The Wire Reinforcement Institute is a non-profit organization representing the wire fabric makers. Its program is one of education, research, promotion and assistance to industry and the general public, in the interest of superior steel fabric-reinforced concrete construction. Institute's headquarters is in Washington, D. C., with Frank B. Brown managing director.

GEORGE K. MCCORD has been appointed district engineer for Wisconsin by the Portland Cement Association, with headquarters in Milwaukee. He succeeds W. D. Kimmel, who has retired from the Milwaukee post with one of the longest service records.



Four Fuller-equipped scrapers lead the way for Hubbard Construction Company on roadbuilding, development and utility installation projects. Equipment includes one Euclid TS-24, a TS-14 and two S-12 Scrapers featuring Fuller 5-G-1220 Transmissions, and two LeTourneau-Westinghouse Tournapulls with Fuller L-1220s.

Geared by FULLER . . .

"We get faster work cycles and longer life with countershaft brake and pressure lubrication systems."

"Reliability, economy and serviceability are exceptionally important in purchasing new construction equipment," says J. C. Reddick, Vice President, Hubbard Construction Company, Orlando, Florida. "Fuller Transmissions meet the requirements for long life and fast work cycles that we must have in our scraper operations."

Fuller's countershaft brake gives quick, easy upshifts without double clutching, keeps speeds up and cuts cycle time. The pressure lubrication and filtration system prolongs gear and bearing life.

For long life, easy shifting and positive lubrication in your scraper operations, specify Fuller Transmissions which include the countershaft inertia brake and pressure lubrication and filtration systems.

Ask your dealer about these features designed to put more profit in your operation.

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Unit Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 6, Cal. and Southwest Dist. Office, Tulsa 3, Okla. Automotive Products Company, Ltd., Automotive House, Great Portland Street, London W.1, England, European Representative

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AGC Executives Meet in Washington

Over 70 staff executives of chapters and branches of the Associated General Contractors of America recently attended the 8th annual AGC joint Executives' Conference in Washington, D. C.

The conference was addressed by AGC national President John A. Volpe, Malden, Mass. (Mr. Volpe is Republican nominee for governor in Massachusetts).

Also on hand was AGC Vice President M. Clare Miller, McPherson, Kan. Mr. Miller reported to the chapter executives on the status and problems of the federal highway program, and on the development of the Better Highways Information Foundation, in which the AGC is participating.

James D. Marshall, executive director of the AGC, also spoke at the opening session.

The Joint Executives' Conference furnishes an annual forum for the discussion of construction industry problems and developments by local staff personnel of the AGC chapters and by the national staff of the association.

The AGC, with approximately 7,300 members firms, is a spokesman for the nation's largest industry—construction. Its 127 chapters and branches are located in all 50 states.

Sam C. Guess, executive secretary of the Spokane, AGC chapter, is chairman of the AGC Secretaries' and Managers' Council.

One of the features of the conference was a session devoted to a study of the operations of the National Joint Board for the Settlement of Jurisdictional Dispute in the construction industry. Members of the joint board participating were Chairman R. J. Mitchell, AGC representatives R. A. Moyer of Washington, D. C., and Ancle C. Tester of Clinton, Md., Carpenter representative T. A. Murray and Operating Engineer representative Hunter Wharton.

Other speakers at the conference included Carl Lloyd, executive vice president, Society of Industrial Realtors; Dr. Franklin Dunham, U. S. Department of Health, Education and Welfare; Stanley Butcher, U. S. Bureau of Labor Standards (discussed a safety training course for construction supervisors); and John T. Dunlop, impartial chairman of the Construction Industry Joint Conference.

Unique Student Award, Contractor-Supported

Again during the 1960 summer a student in highway engineering from the University of Illinois, is making a 10,000-mile tour through 13 Western states under a unique scholarship or "travelling award".

The C. C. Wiley travelling award this year is given to Thomas W. Kennedy who will write a detailed report. The $1,200 award honoring Professor C. C. Wiley, long-time highway engineering professor at the University, is underwritten by the General Paving Company, of Champagne, Illinois.

The recipient, Kennedy, plans to return to the School as a graduate student and research assistant on highway investigations after his travels.

NOW-430 HORSES UNDER THE HOOD CURTISS-WRIGHT CW-226

26 cu. yds. struck–36 cu. yds. heaped

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CURTISS-WRIGHT CORPORATION
SOUTH BEND, INDIANA
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TURN PAGE

V-12 ENGINE...MORE POWER-MORE PERFORMANCE FOR THE CW-226

Now — with the 430 hp CW-226 you get production unmatched by any other two-axle scraper. An increase of 70 hp combines with the 26 cu. yd. struck, 36 cu. yd. heaped capacity of the mighty CW-226 to pile up bigger loads — faster cycles — greater profits than any competitive machine.

In addition to this top speed and performance, the big CW-226 incorporates exclusive Roto-Gear steer for perfect, effortless control — constant live power control unit and easy-loading, curved bowl design for top performance in the cut — Positive roll-out ejection for fast turn-around in the fill area . . . all adding up to greater profits for you with the new V-12 CW-226.

Call your C-W distributor for details on these and the many other features that make Curtiss-Wright the industry's highest producing scraper line.

CURTISS-WRIGHT—A complete line of high-performance earthmovers

SELF-PROPELLED SCRAPERS

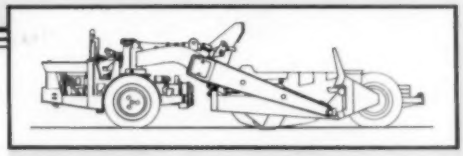
Four, 2-axle scrapers and a 3-axle scraper provide capacities from 7 to 26 cu. yds. struck, up to 36 cu. yds. heaped. A general brochure and individual specification sheets are available from your distributor.

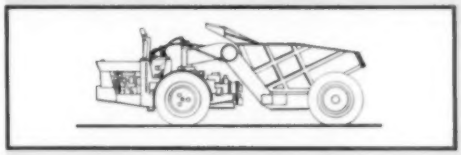
REAR DUMPERS

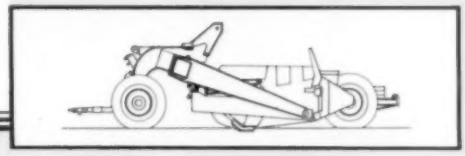
Three rear dumpers in capacities of 25 and 35 tons are interchangeable with corresponding scraper models. For details, request a general brochure or individual specification sheets from your Curtiss-Wright distributor.

TRACTOR-DRAWN SCRAPERS

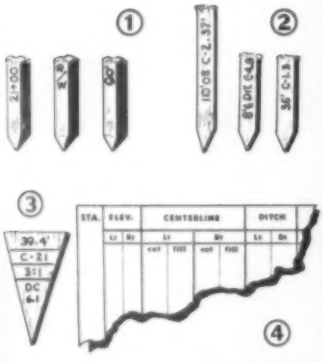
The CWT series of six tractor-drawn scrapers covers a capacity range of 8 to 30 cu. yds. struck, up to 39 cu. yds. heaped. Ask your distributor for a comprehensive specification sheet on the CWT line.





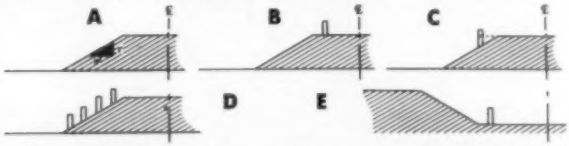


STAKES—THEIR USE ON AN EARTHMOVING JOB



Once the job is awarded, the owner's engineer will usually set certain stakes by which the dirt will be moved. The first among these will be the right-of-way stakes. These define the extreme limits of the property belonging to the owner. They are usually placed at every station and at every break in the right-of-way. (Fig. 1) These stakes usually show the station number and distance to the center line. Another class of stakes are information stakes. (Fig. 2) These stakes give construction information for structures such as head walls, culverts and clearing limits.

Other necessary information can be shown in a variety of ways. This information would include distance to center line, shoulder slope and back slope, height of fill or depth of cut, ditch center line and ditch cut. (Fig. 3) In some instances this information is listed on slope stakes set by the owner's engineer at the toe of fills or the top of the cuts. These are set exactly at the toe or top or else offset a specified distance to prevent their being disturbed. In other instances this is shown on special stakes offset from the center line. A third manner of handling this consists of referencing everything to either the right-of-way stakes or a special offset line and furnishing the contractor with "grade sheets" from which he can set all necessary construction stakes. (Fig. 4) On cuts and fills of any size the most important stakes are probably the slope stakes. These stakes are set initially at the toe of fills and the top of the back slope on cuts. From this point they follow the slope as the work progresses. They should be checked frequently enough to assure close control of the slopes. It is customary to carry each stake from the preceding stake. (Fig. D) This can be done with considerable accuracy, but any errors made would tend to be cumulative. Therefore, on cuts and fills of considerable magnitude these should be occasionally checked with an instrument and steel tape. This is particularly important on steep slopes where corrective action is very expensive. Slopes are generally indicated by a ratio of the horizontal distance to the vertical distance. (Fig. A) A 2:1 slope indicates that for every one foot of vertical rise the slope narrows two feet horizontally. In checking slopes, if the slope is too full but does not require corrective action, the stake will actually be set on the top of the fill and in from the edge of the fill the required distance to make the correction. (Fig. B) If the slope is hollow or sagging, then the stake will be set with a grade mark indicating where the dirt should fall. (Fig. C) The same principle but in reverse applies to cuts. Should the slope be too steep then the stake should be set out in the floor of the cut. (Fig. E) Should the slope be too full, then the stake should have a cut marked on it indicating the amount of material that should be removed to correct the slope.



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CIMA Announces 1963 Road Show Committee

The Construction Industry Manufacturers Association has appointed the following to serve as the Road Show Committee.

(Chairman): Boyd S. Oberlink, Allis-Chalmers Manufacturing Co.; (Vice Chairman): A. J. Lichtinger, The Wellman Engineering Co.

(Members): Donald V. Buttenheim, Buttenheim Publishing Corporation; W. K. Cox, Caterpillar Tractor Co.; Warren A. Holden, Construction Machinery Company; Robert E. Hunter, Detroit Diesel Engine Division, GMC; Kenneth Lindsay, Iowa Manufacturing Company; J. E. Mitchell, The Firestone Tire & Rubber Company; Buel M. Wallis, Schield Bantam Company.

The group, with the approval of the CIMA Board of Directors, will establish CIMA policy and give overall supervision to the administration and execution of the coming exhibit. The members according to CIMA's executive vice president, R. P. McKenrick, will remain in office until the 1963 show has been held and final accounting made.

Huber-Warco executives who headed the recent sales conference: Jacque E. Jones, president; Joseph Whelan, Glenn Porter and J. E. Farst, sales managers.

Huber-Warco Fetes Distributors

More than 300 representatives of the Huber-Warco Company of Marion, Ohio, gathered in Columbus and Marion, Ohio, for a 3-day sales meeting recently.

Distributors from the United States, Canada, Mexico and Cuba took part in the conference that marked completion of a five-year program of plant consolidation and product development. The program began in 1955 when the W. A. Riddell Company of Bucyrus, Ohio, and the Huber Manufacturing Company of Marion, Ohio, were merged.

Huber-Warco manufacturers a complete line of motor graders, road rollers and maintainers with distributors throughout the free world.

SPECIAL REPORT TO CATERPILLAR OWNERS:

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Parts you can trust
...cost less per hour

announcing...

BONDED BUY PARTS ASSEMBLIES

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Guarantee Bond

Know All Men by these Presents,

that _____

of _____ (hereinafter called Seller),

is held and firmly bound unto _____

of _____ (hereinafter called Buyer)

in the sum of not exceeding the lesser of FIVE THOUSAND DOLLARS ($5,000.00) or Seller's price, with respect to each parts assembly described below, for the payment of which Seller hereby binds itself, its successors and assigns by these presents.

The Condition of this Obligation is such that Whereas Seller has sold to Buyer the below-described parts assembly or assemblies originally manufactured by Caterpillar Tractor Co. and reconditioned in accordance with practices recommended by Caterpillar Tractor Co.:

DESCRIPTION	PART NUMBER	SERIAL NUMBER	SALE PRICE

And Whereas Seller guarantees each said parts assembly against unsatisfactory performance due to defective material or workmanship for _____ days after the date of sale shown below (herein referred to as the guarantee period), the obligation under this guarantee being only to repair or replace, as Seller may elect, any said assembly which proves defective in material or workmanship under conditions of normal use during the guarantee period at Seller's expense (including cost of all necessary materials and labor) up to a maximum of the lesser of Five Thousand Dollars ($5,000.00) or Seller's price, with respect to each said assembly, except that the cost, if any, of transporting each said assembly from and to Seller's place of business shall be paid by the Buyer.

Now, Therefore, if Seller, its successors and assigns shall in all respects well and truly perform the obligation under the guarantee recited above, then this obligation shall be void, otherwise to remain in full force and effect.

THE ABOVE GUARANTEE IS VOID, AND SELLER SHALL BE UNDER NO OBLIGATION THEREUNDER, IF CLAIM IS NOT MADE TO THE SELLER WITHIN THREE (3) DAYS AFTER DISCOVERY OF THE DEFECT UPON WHICH THE CLAIM IS BASED.

You can have complete confidence in any Parts Assembly Exchange or Rebuilt Unit carrying the dealer's new Bonded Buy label. You'll receive a Guarantee Bond, backed by the Lumbermens Mutual Casualty Company of Chicago, Illinois, giving the guarantee conditions agreed upon at time of sale. This is further evidence that a Caterpillar Parts Exchange or Rebuilt Assembly is in first-class condition—another way of expressing the careful and thorough workmanship that goes into each of these reconditioned assemblies.

The cost? It compares favorably with the cost of doing the reconditioning work yourself. Often less . . . because of the availability of special equipment and servicemen's skills in the dealer's shop. Your final net cost is based on parts and labor necessary to put your worn assembly in A-1 condition—same as the exchange unit you receive.

Here's why Cat Reconditioned Assemblies save you money. You trade down time for more *go* time. Simply:

1. **Call your Caterpillar Dealer and arrange for the Parts Assembly you need.**
2. **Remove your worn assembly and install the reconditioned unit.**
3. **Put your machine back to work immediately and return the worn unit to your dealer.**

Any way you look at it, a Bonded Buy Parts Assembly is a good deal. You get a dependable unit . . . guaranteed in writing. The cost is approximately the same had you done the work yourself. Time saved can be converted to cash because your machine's working and earning. Contact your Caterpillar Dealer today. Find out what assemblies he stocks (new items are being added daily).

SERVICE TIP: Never allow your present machine components to become worn to the point where reconditioning is impossible.

CATERPILLAR

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

Editorials . . . . in Brief

Ask someone in highway work what is the Big Problem right now and you'll get different answers, depending on whom you ask.

A highway official will say, "What can we do to undo the damage done by that Readers Digest article?" Brooding defensively over this unfair (but highly readable) "expose" is a favorite pastime this summer.

Ask an Iowa contractor, on the other hand, and he'll tell you that weather has been the Big Problem. In this state a cold, wet spring merged into a wet early summer, keeping the contractors from making much money clear through into July. According to Orville Crowley of Iowa's AGC chapter many firms have been really hard hit.

As often mentioned on these pages, a contingency item for bad weather should never be left out of a bid. The way bidding has gone of late in Iowa, and elsewhere, something was left out.

One essential of a good accident prevention program, notes a Corps of Engineers safety expert, Sam Elkins of Dallas, is good housekeeping around the job. "No safety planning can be complete without proper clean-up; safety actually starts with cleaning up the job," he said in a recent bulletin of the National Safety Council's Construction Section.

This editor has often noted the spic-and-span appearance of the contractor's equipment yards and work areas on airfield projects handled by the Corps of Engineers. This is in painful contrast with a good many highway jobs, where the picture is still one of clutter and scatter, with obstacles to trip over and even boards lying around with nails sticking out and nobody seeming to care.

Factory owners would fire managers who allowed such clutter, if for no other reason than a concern over maintaining good public relations. With highway contractors, it is encouraging to note that more jobs are beginning to have a cleaned-up look, as a result of the safety work of the contractor associations and insurance companies—and the discovery by the boss that anything that helps safety helps production and profits.

The slip-form paver continues to make news (see Roads and Streets, May). With upward of a million square yards of paving placed or under construction by this method in California, and with good success reported in Colorado, Rhode Island, New Mexico, and elsewhere, this type of paver is now at its critical point of acceptance. Question: how long a time will pass before other state highway departments will permit it to be tried, at least?

Wire fabric reinforcement can be used with slip-form paving, experience in Colorado shows, thus removing one bugaboo.

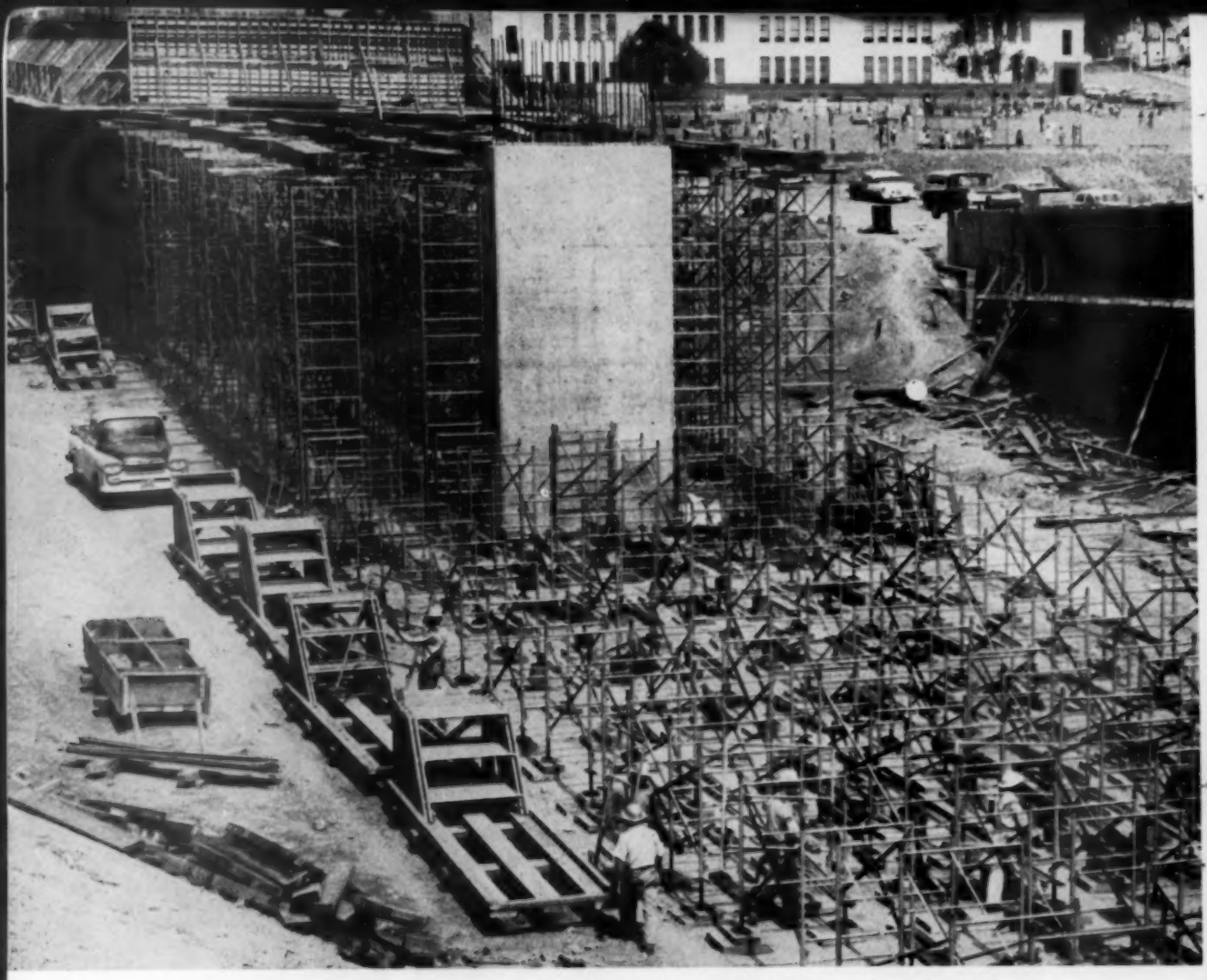
The big thing with any seemingly meritorious development of this kind is to give it the green light. If slip-form paving methods can save a dollar or two per cubic yard of concrete, as some say it can, that saving ought to be passed along in the form of lower bids where the contractors are willing.

Roads and Streets holds no brief for any particular method of paving. The point of concern is the slowness in the past in the adoption of better methods that have come along.

One of the most compelling reasons for keeping the highway program going full speed is the economic cost of traffic accidents. Let's say, for sake of argument, that saving 4,000 lives a year is not worth the trouble. This number of deaths almost certainly would be saved by the Interstate system were it completed and in service today, as compared to the obsolete, overcrowded roads presently carrying the traffic. The point is that the economic loss represented by these deaths alone, reaches a sum that would largely repay the Interstate program's cost.

The latest issue of Public Roads, research review publication of the Bureau of Public Roads, presents a statistical analysis on the dollar value of wrecked autos, hospital bills and other economic costs from traffic accidents. Will someone please translate the figures into language newspapermen and magazine writers can pick up?

Harold J. McKeever



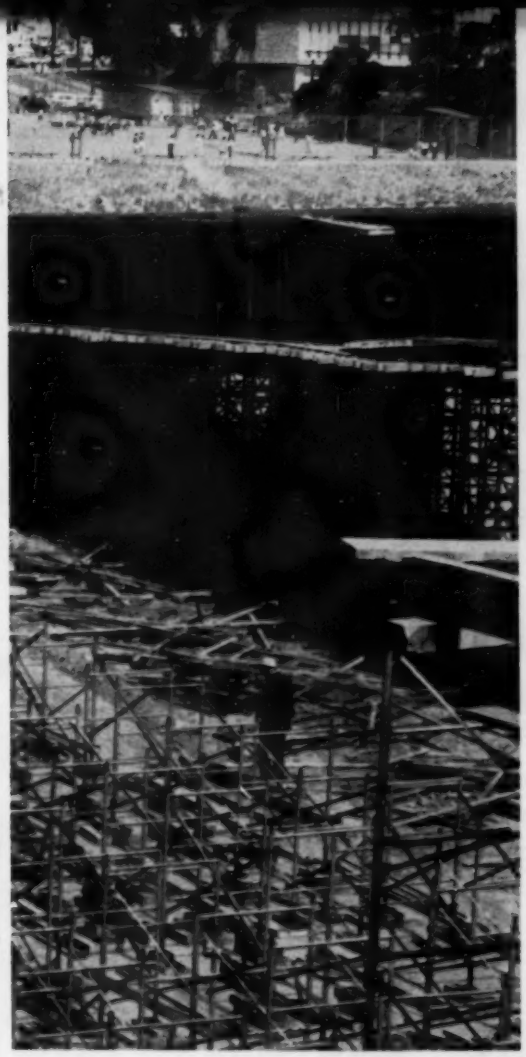
Falsework rises quickly and accurately through careful pre-planning and pursuing a simplified, well-understood erection procedure. Note close proximity of frame racks to rising falsework.

Tubular Falsework for 30-Bridge Freeway Maze

Large-scale use of tubular steel falsework is playing a role in constructing the "super-duper" East Los Angeles interchange. This huge tangle of expressways and ramps, involving a maze of grade separation bridges, is taking shape under a $9.5 million contract by Peter Kiewit Sons' Co.

The no-two-alike structures are being erected under a tight job schedule. The falsework has lent itself to rapid erection and stripping operations and, most important, to easing job congestion problems.

"Material handling is the greatest source of time loss on a job like this," observes job superintendent Norman Barnes. "In a two-mile-long strip we have over 30 major structures being built over, under, alongside and tying into the Santa Ana Freeway near downtown Los Angeles.

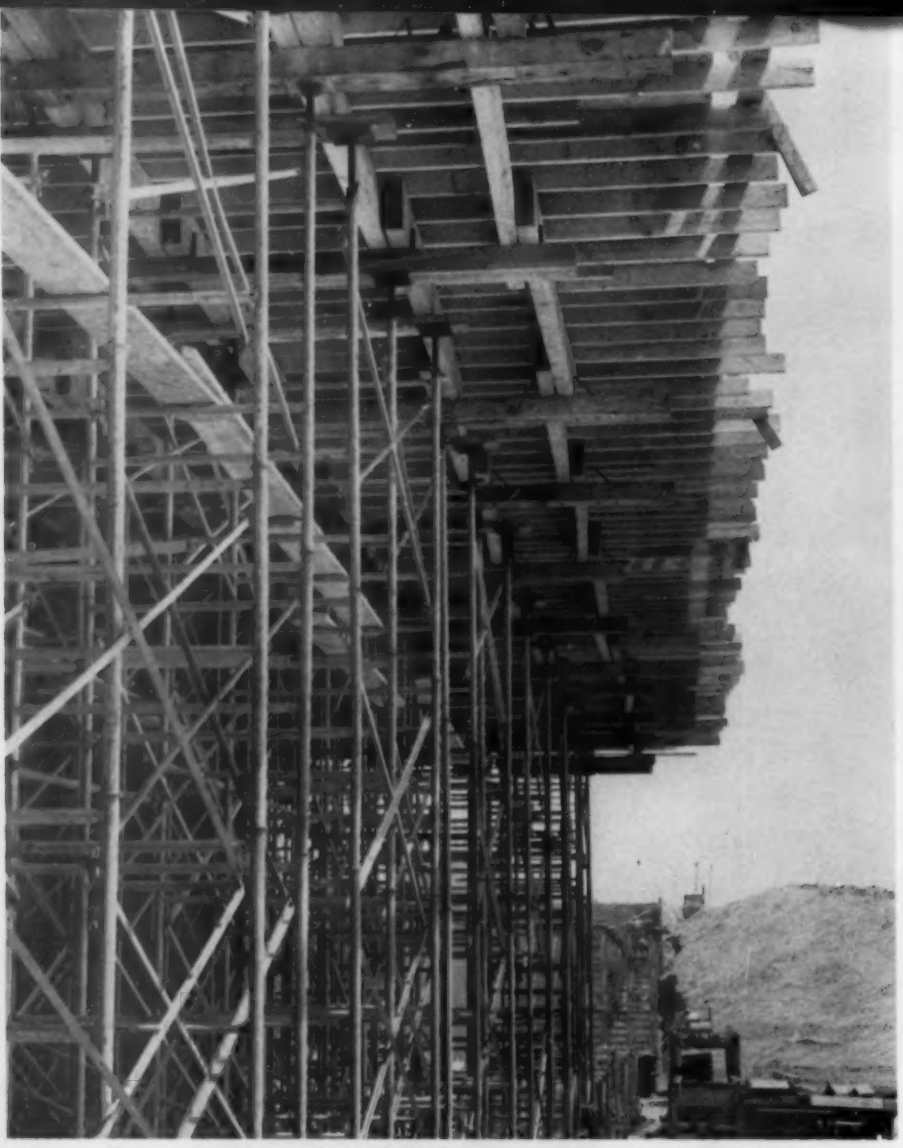


Timber bents (foreground and left) provide footing for falsework on this sharply falling terrain beneath a 40-foot-high structure. →

The whole operation is complicated by the fact that the present Santa Ana freeway carries up to 15,000 cars per hour, thousands of them using access routes cutting through the middle of our spread."

One of the first firms to experiment with tubular falsework, PKS moved onto the job with 6,000 steel frames of 3′, 4′, 5′ and 6′ heights—and a foreman who knew when, where and how to use them. With this project, largest ever let by California division of highways, now well along, falsework foreman Larry Fischer and his carpenter foreman in charge of erection, John Shimmick, took time out to discuss the fine points of the falsework use.

"Tubular steel falsework has some limitations," explains Fischer. "There are times when trying to use this falsework without the aid of



Finished falsework, showing accurate column positioning, result of precise location of jacks and caps. Almost no loss is experienced when stripping; timbers re-used many times.

timber structures—particularly in rough terrain—can cause more grief than is offset by the inherent efficiencies of tubular materials."

Moving around the complicated interchange project, Larry Fischer and John Shimmick discussed the techniques that they have adopted in the course of three years of large-scale testing and use of tubular falsework.

"We turn to tubular falsework because it goes up quicker, comes down quicker, does a better job. There are the additional benefits or lack of waste and ease of job clean-up. Clean-up is an important consideration on a job as big and congested as this one."

Larry Fischer pointed to the tubular falsework running the length of a 40-ft. high freeway structure.

"We haven't found height to be a problem," states Fischer. "Depending on the load and the closeness of our towers, we will frequently use tubular cross bracing across the falsework to reduce the chance of buckling."

"One thing we have to be careful about," explained John Shimmick, "is trying to use tubular falsework when timber would be quicker to erect. The next biggest problem is making sure your erection program —the system of using various predetermined size frames to construct the towers—is simple and thoroughly understood by all your men."

Shimmick went on to note that two use characteristics that are notable with tubular falsework—and two which distinguish it from timber—are those pertaining to the loading and adjustment of the tubular steel towers.

"It doesn't have timber's flexibility," explains Shimmick. "Your weight calculations have to be accurate to assure you that your tower spacing is satisfactory. Then, you've got to be very careful to plumb as you build. When towers rise over 15 ft., they can bow rather easily, and this calls for cross-bracing. Timber

Continued on page 76

By R. L. Peurifoy
Construction Consultant, Bryan, Texas

Bigger Push Tractors Can Pay Big Dividends

When will your job justify a heavier pusher? Here is how to decide with least guesswork.

You do not have to be a big contractor to apply the latest profit-boosting in earthmoving. Push loading is one of the places where it may pay to re-examine your equipment selection and job methods and costs.

In order to illustrate how an analysis may be used to increase job profit we will consider the following job and equipment.

Job conditions:

Material—average clay

Weight—3,050 lb. per bank cu. yd.

Swell—30 percent

Volume—660,000 cu. yd.

Borrow pit—good efficiency possible

Haul distance—2,350 ft. average

Haul road—firm and well maintained, with average grade and rolling resistance equal to 120 lb. per ton

Dump site—large enough for efficient operation of the equipment

Average scraper cycle time, excluding loading time —5.1 min.

Construction equipment:

3 Tractor-pulled scrapers
  Tractor—345 hp.
  Scraper—heaped capacity—27 cu. yd.
1 140-hp. crawler tractor and dozer on the fill
1 140-hp. crawler tractor and tamping roller
1 140-hp. crawler tractor and disc
1 115-hp. motor grader with 14-ft blade
1 Push tractor—consider using a 335-hp. or a 225-hp. unit

All specified powers are the maximum outputs of the engines.

Table 1 gives representative cost of each unit of equipment, and the cost per hour for owning and operating each unit, including wages paid to the operators.

Most Economical Scraper Load. While it is possible to load a scraper to its heaped capacity of 27 cu. yd., this volume may not represent the most economical load. As indicated by the load growth curves in Figure 1, the first part of a load is obtained quite rapidly, but as the load increases, the rate of loading decreases. For example, after a loading time of 0.6 min., pusher A will load 18.5 cu. yd. of earth into the scraper; whereas, if the loading time is increased to 1.2 min., a 100 percent increase in loading time, the load will increase to only 20.0 cu. yd., a gain of 1.5 cu. yd., or 8 percent.

It thus appears that the additional load obtained may not justify the additional time required to obtain it. A study of the curves in Figure 1 indicates that it may not be economical to load a scraper to its maximum capacity under all conditions.

Since the cost of obtaining each additional cubic yard of load increases, especially after a scraper is filled to about 75 percent of its capacity, it is highly

Continued on page 81

While one crew (not shown) cuts neat blacktop "lids" from home locations (see one in gutter), the modified Ford with digger cuts 16" diam. x 41" deep post holes.

Median Barrier Contractor Works Fast Under Heavy Traffic

An extensive job of median-barrier construction, recently in progress in Southern California, is noteworthy for two reasons.

It shows how a contractor can make progress despite traffic hazards when fully mechanized for this special work.

And this job marks the beginning of the California division of highways' aggressive program of "safetifying" its freeway medians. The goal is to drastically reduce collisions caused by out-of-control vehicles crossing to the opposite roadway.

The two fence designs now under

Nearly 65,000 bolts for the beam barrier were tightened with impact wrenches, powered by a portable generator (in wheelbarrow).

construction are the result of extensive dynamic full-scale tests carried out by California's division of highways (see *Roads and Streets*, April, 1960). Both types are required because of varying widths of the state's freeway medians. The cable chain link design found most effective in the tests, is considered practical only when medians are at least 12 ft. wide. For narrower strips, a metal beam design is used.

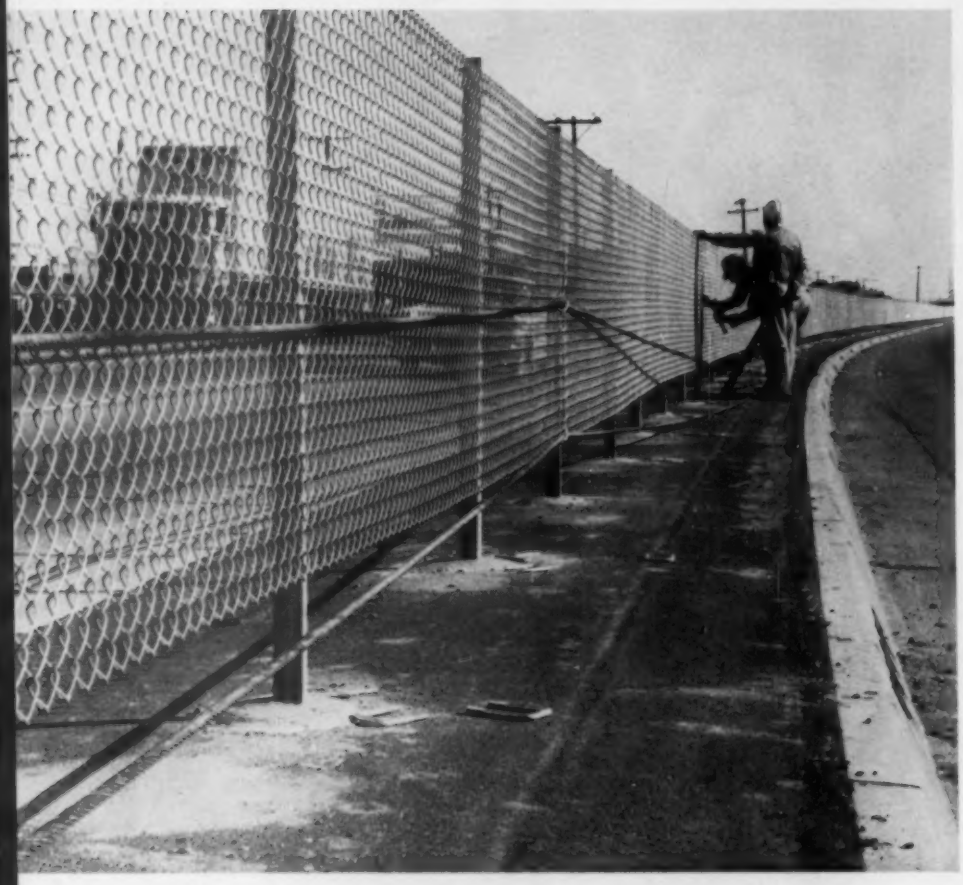
The first contract let for putting in the test-approved fences was for a section of Santa Ana and Hollywood Freeways in southern California. The $322,000 job awarded to Milleman & Sooy, of Redlands, California, included 16,800 lin. ft. of cable chain link structure ($59,000), 4,150 lin. ft. of blocked-out single beam barrier ($24,000), and 26,000 lin. ft. of blocked-out double beam barrier ($239,000). Specifications designated use of American-made materials, and completion within 90 working days.

The job has presented formidable management problems due to the heavy traffic (12,000 to 15,000 cars per hour, speeds up to 65 mph), and the requirement of closing only one lane of traffic at a time, for no more than one mile at a time. The high-speed traffic made job access hazardous. And the one-mile limitation on lane crossing made it difficult to organize for most efficient use of men and equipment.

Job inefficiencies caused by these limitations were largely offset by use of specially modified equipment—and through some far-sighted planning in the handling of fence post spotting and checking.

Cable Chain Link

This fence design is made up of galvanized 4-ft. knuckled chain link mesh, hung 9 in. above the median



With fabric "hog-ringed" to tension wire atop steel posts, ¾-inch steel cable are raised in place and secured with U-bolts. Nuts, tightened to 35 lb. tension on U-bolts, are only fastening betwten cable, fabric and posts, thereby assuring "give" when struck by vehicles.

strip on 2¼" x 4.1-lb. H-section galvanized fence posts set on 8-ft. centers. Three ¾-in. cables are strung along the fence after the fabric is in place. One of the cables is along the bottom of the fabric 9 in. above the ground, the other two on either side of the fence 30 in. above ground. Both the fabric and cables are secured to the posts by two U-bolts that span the cables on each post.

The top of the fabric is secured to a tension wire with hog rings spaced every 2 ft. The lower edge of the fabric is tied to the lower cable on 2-ft. centers with 9 gauge aluminum wire. U-bolt connections are used exclusively to permit "give" when the fence is struck.

In the job here described, a 100-ft. surveyor's chain was used to spot post locations along the surfaced median strip. A disk of asphaltic topping slightly larger than the finished hole was removed to prevent damage to the surrounding black-top area by action of the power auger. Then, Milleman & Sooy's custom-modified series 601 Ford tractor and Danuser digger went to work.

Modifications on the tractor included reversal of the driver seat, steering wheel and all controls so that the operator could work the unit normally while facing to the rear, in digging position. Two hydraulic rams were added to the Danuser unit, permitting application of pressure to the auger and thereby speeding the hole. Power for the hydraulic unit was provided by a pump mounted on the front of the tractor.

Because all posts had to be plumbed, the holes, too, required plumbing. Geared cranks controlling the side angle of the auger were installed between the fixed piston of the rams and its supporting framework. The location and gearing of these adjustments enabled the operator to plumb his auger as he sat.

Superintendent L. J. Grey anticipated occasional difficulty with conduit, pipes and large rocks in the post hole digging operation. In order to spare the equipment and save time by quickly backing the auger out of a hole, the power take-off was fitted with an auxiliary reverse gear that enables the operator to instantly reverse the auger.

The success of these modifications can best be judged by noting the unit's production. The 8" x 31" holes on 8-ft. centers used for the chain link posts were dug at the rate of four a minute. The 16" x 42" holes for the wooden posts of the metal beam barrier were dug three every two minutes. Most important, these holes were plumb and required a minimum of hand finishing.

Continued on page 96

Contractor supervisory personnel pose for photo at 1959 conference on highway construction practices, conducted by Ohio State University under Emmett H. Karrer, Professor of Highway Engineering, in cooperation with the Ohio Contractors Association. Topics covered included: supervisors' responsibilities; use of plans and specifications; construction surveying; equipment management; job safety; labor regulations; concrete, asphalt, other field methods.

Contractors' Men Study Methods and Management

By Emmett H. Karrer

Professor of Highway Engineering
The Ohio State University

Conferences, short courses, in-service training courses, seminars, workshops, symposiums—call them what you will—they are all parts of the process of continued education.

Education is a continuing process and does not stop with the completion of formal schooling, whether that be elementary school, high school, or college. Education might be defined as the process of conveying thoughts from one person to another. The value of education lies in the ability of the listener to correlate new information and new thoughts with previous knowledge and thus to gain a better understanding of the problem under consideration.

In an expanding industry, such as transportation, there are new developments, new techniques and new methods of doing things learned every day. If the highway engineer or constructor is to do a good job of planning, designing, constructing, maintaining or operating the roads and streets, he must continue his education.

Continued or extension education for an industry of the state is part of the service which a state-supported university can offer. Recognizing this need, many such institutions have set up rather elaborate organizations in this field. The need for extension courses in highway engineering offers a university both an opportunity and an obligation. Better know-how will produce better roads for less money, and thus reduce the tax cost per unit of transportation service.

The work which has been carried on at The Ohio State University during the past few years, in this field of continued education for road building, is perhaps typical of that which can be accomplished in any state.

During the summers of 1957, 1958, and 1959, the author worked as a consultant for The Ohio Contractors Association, spending his time visiting construction projects and listening to the problems of contractors. Their problems are naturally many and varied. But when analyzed the problems usually have boiled down to three general categories. These are (1) Problems of interpretation of specifica-

tions and plans; (2) Knowledge of engineering fundamentals which will enable a contractor to anticipate equipment and manpower needs on a project; and (3) Problems of management of men.

It is not uncommon to find that the contractor's personnel have interpretated the phraseology of specifications or notations on plans differently than has the owner's project engineer. Such cases of difference of opinion result, at best, in lost time for the contractor, in that he may not have planned to have the proper equipment and materials ready at the right time. In the seasonal profession of highway construction even short periods of lost time are expensive. Sometimes these differences in interpretation are due to technological developments known by the state but not known by the contractors.

In addition to the problem of having available on a project the right kind and right amount of equipment for accomplishing the planned work at the lowest cost, the contractor should anticipate the development of some unforseen conditions which are not entirely as shown on the plans. Such developments are common and are not necessarily due to poor engineering in design. With variable soil, variable moisture, variable foundations, and variable materials, the cost of preparing plans in such detail that there would never be any field changes would be far greater than the cost encountered in making some changes in plans as construction progresses.

In order to avoid losing time and thus losing money, a contractor must recognize situations as they develop on his project—circumstances which are not entirely covered in his contract and he must anticipate what revisions of procedure or materials or equipment he will need in order to cope with these situations. The knowledge of fundamentals of the characteristics of the material being handled is important to the contractor.

Supervisory Staff Development.

While a few contractors have carefully selected and trained their supervisory staffs in the art of managing men, the more common pattern is to find that the supervisor is a member of the family, a relative, or a man who has demonstrated his ability in operating a shovel, a paver, or some other piece of equipment. Problems of management of man-power have become more complicated by a multitude of labor regulations, safety regulations, wage regulations, etc. A good supervisor needs training in management methods.

If a man has been out of school ten years or more he needs only to look at some of his old text books to realize how things have changed in that period. Many of our present techniques for accomplishing work, and many of our now commonly used pieces of equipment, have been developed very recently.

These problems are not peculiar to any one contractor; many contractors need answers to the same questions. Recognizing this, it was decided that a short course for contractors' supervisors of highway construction might be useful. Working closely with the education committee of The Ohio Contractors Association the author prepared the details for such a short course to be conducted by the Department of

Subjects Presented At

As set up by Ohio State University and the

Part 0. ORGANIZATION OF THE COURSE	
Registration Procedure to be followed, text books, notebooks, reading assignments, etc. Self introduction of students Group Photograph	Emmett H. Karrer Prof. of Highway Engr. OSU
Part 1. THE SUPERVISORS JOB	
A. Supervision—what it is and how it works.	Don E. Leatherman Prof. of Business Organization, OSU
B. Responsibility of Supervisor to the Contractor.	C. F. Replogle The C. F. Replogle Co.
C. Responsibility of Supervisor to the Owner.	Harold L. Krauser Chief Engineer, Bureau of Constr., Ohio SHD
Part 2. PLANS & SPECIFICATIONS	
A. Knowing your highway plans.	C. R. Hanes Asst. Engr. of Const. Ohio SHD
B. How to use the specifications.	Charles Sheley The V. N. Holderman Co.
Part 3. CONSTRUCTION SURVEYING	
A. Construction stakes and their use. 1. Centerline control. 2. Cross-section control. 3. Slope control. 4. Trench and ditching control. 5. Culvert layout. 6. Pavement surface control.	Bill Church The V. N. Holderman Co.
Part 4. APPLIED ENGINEERING FUNDAMENTALS	
A. Problems of excavation and embankment construction.	R. F. Baker Prof. of Civil Engr. OSU
B. Problems of Flexible Pavement Construction.	Barney Jones The Asphalt Institute
C. Problems of Rigid Pavement Construction.	George McCord Portland Cement Assoc.
Part 5. MANAGING CONSTRUCTION EQUIPMENT	
A. Cost of equipment when used and when idle. Movie: "The Cost of Lost Production"	Bill Early Columbus Equipment Co.
B. Measuring the possible production and causes of lost time on *your* job.	Emmett H. Karrer

Contractor Personnel School

Ohio Contractor Association for Spring, 1960

Part 6. PLANNING AHEAD	
A. Preparing the construction schedule, and equipment use schedule.	C. L. Thompson C. F. Replogle Co.
B. Ordering, scheduling, and controlling materials.	Wally Yamarick C. F. Replogle Co.
C. Field and office records.	Charles Amato A. J. Baltes Co.
D. Trip through State Highway Testing Lab.	
Part 7. SAFETY	
Movie: "The Gamblers"	
A. The cost of accidents.	Al Meaner Wayne Christensen
B. The cause of accidents.	and Leonard Freed of
C. Legal Requirements for the Prevention of Accidents.	State Industrial Comm. of Ohio
D. Good Housekeeping on the Job.	Bob Chapin Chapin & Chapin, Inc.
E. A safety program for you.	A. P. Harness Ohio Contractors Assoc.
Part 8. LABOR REGULATIONS & RELATIONS	
A. Labor agreements.	A Panel Discussion Presiding:
B. Relationship with Unions.	Ralph Beerbower Acting Secretary
C. Prevailing wages on public contracts.	Ohio Contractors Assoc.
D. Question period.	Panel: Vern L. Stouffer, Attny. Gordon Brode, V. P. Labor Executive Committee Ohio Contractors Assoc.
Part 9. EMPLOYEE AND HUMAN RELATIONS	
Movie: "Jonah and the Highway"	U. S. Steel Company
A. You and your men.	W. B. Logan
B. How do employees get that way?	Prof. of Education OSU
C. Getting your thoughts across to your employees.	
Graduation Luncheon Introduction of Guests Remarks Presentation of Certificates	

Civil Engineering at the University. The course was offered first in February of 1958.

The objective of this short course was stated as follows:

The successful highway contractor must make a profit; otherwise he will soon cease to be a contractor. To insure this margin of profit, he must have efficiency on his construction job. Modern highway construction methods, new developments in machinery and labor management problems, place a big responsibility on the construction supervisor.

The purpose of this course is to help the construction supervisor to keep abreast of developments in safe and efficient practices. The instruction will present principles and practices through which harmonious working relationships are encouraged and will provide methods to assist the supervisor in promotion of job efficiency and safety.

The short course will be conducted as a school with lectures, discussion periods, and written examinations.

In anticipation a possible attendance of from 30 to 35, this program was set up, text books and notebooks purchased, speakers engaged, rooms rented, etc., coming to a budgeted cost of $60 per man We were delighted and somewhat overwhelmed with 57 applications coming in for the first school. The committee decided, and I am sure wisely so, that we wanted to conduct the short course as a school and therefore we limited registration to 40, returning the excess checks for registrants above that number. The course was repeated a second time in 1958, was repeated twice in 1959, and again in the winter of 1960.

The school was held in the Student Union Building on the campus, classes running from 9:00 A.M. to 4:00 P.M. daily excepting Friday, when we concluded the short course with a noon luncheon. Each student was furnished with a copy of the textbook, *Construction Planning Equipment and Methods,* by R. L. Peurifoy, and other supplementary literature. Reading assignments were made in these texts. Each student was provided at the beginning of the course with a notebook including a detailed outline of the course, and a separate page for each subject, listing at the top of the page the pertinent information concerning the speaker.

Each morning school was opened with a 15-minute written quiz. This quiz was designed to analyze the student's opinion of the value received from subjects presented on the previous day. After each session of the school, the quiz sheets were studied and summarized and from comments offered by the students, the program was re-examined, expanded in some places and reduced in others by deleting some subjects. It was the feeling of the committee that a school in excess of one week was not desirable, therefore in order to squeeze the school into the actual 4½ days of classes, it was necessary to leave out a good many items which would have been of interest to certain men.

The program for the fifth session of the school, held in 1960 is reproduced in detail on these pages, as being of interest to the planners of similar courses in other states.

Recognizing that the mind can absorb only what the seat of pants can endure, the routine of lectures

Continued on page 56

"Best rigs for my money—they're doing an excellent job," says R. E. Robertson, superintendent of excavation for Montag-Halvorson-McLaughline & Associates on the John Day Lock and Dam project near The Dalles, Oregon. He's talking about his seven DW20Gs with Athey PW20 Wagons, carrying 112,000 lb. shot rock or glacial gravel. Five of the DW20Gs stockpiled 100,000 cu. yd. in three weeks. Day after day they make 185 three-mile round trips, pulling big loads at 32 MPH. Says Master Mechanic Huey Long, "These DW20Gs are built to stay on the job."

"These DW20Gs are really hauling sons-o-guns. We've got over 600 hours (in just two months) on them and they're doing great. And this SynchroTouch is undoubtedly the coming thing—only it's here now." This is the way R. A. Heintz describes the five DW20Gs with 482B Scrapers on Heintz & Rogers' railroad relocation project around Ice Harbor Lock and Dam in Walla Walla County, Washington. The tractor-scrapers handle both belt-loading and push-loading tasks. The versatility of these tractor-scrapers has been augmented by sideboarding for easier top loading. Hauling 25 yards of bank run gravel, the DW20Gs move 240 loads every eight hours, cycling in four minutes on the ⅜-mile haul.

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Look at the big jobs—where high, continuous production is a must! John Day Lock and Dam: 3,700,000 yards—Cat DW20G Tractors with Athey PW20 Wagons for prime movers. Railroad relocation for Ice Harbor Lock and Dam: 6,500,000 yards—another Cat DW20G-482B Tractor-Scraper job.

Put this versatile, dependable DW20G on your job and watch its top performance on all conditions, month after month! Its 345 HP (maximum output) Cat Diesel Engine quickly speeds it to top 35.8 MPH, cutting precious seconds from cycle time. Big power takes it up grades fast, keeping production on schedule. With interchangeable 27 cu. yd. (heaped) Cat 456B or 34 cu. yd. (heaped) 482B Scrapers or 40-ton PW20 Wagons (built by Athey Products Corporation), it loads fast—hauls fast—dumps fast. See your Caterpillar Dealer for on-the-job proof of this versatile, dependable DW20G.

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TOUCH AND GO SHIFTING WITH SYNCHROTOUCH Optional Synchro-Touch Transmission Control lets operator dial desired gear, combining split-second shifting with economical direct drive transmission. DW20G with SynchroTouch means faster shifting for faster cycles, more big payloads per hour, and reduced operator fatigue.

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POWERFUL DW20G FOR PROVED PERFORMANCE ON THE BIG JOBS

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OHIO'S METHOD STUDY

Continued from page 53

was broken with a coffee break each morning and a recess each afternoon and on Wednesday afternoon two hours were devoted to an inspection trip through the State Highway Testing Laboratory which is on the University campus.

After completing the first school in the winter of 1958, the only serious complaints received from men who attended were that we did not have enough information on earthwork to suit the grading contractors, we did not have enough information on bridges for the bridge contractors, we did not have enough information on flexible paving to suit the bituminous paving contractors, and not enough information on rigid paving to suit the portland cement concrete contractors.

In the second year we held, in addition to the basic course, a short 2½ day course for contractors' supervisors of bridge construction. The outline for this course was as follows:

Part 1. Opening Session
- A. Reading Assignments, Notebooks, etc.
- B. The job of the supervisor.
- C. Plans and specifications.

Part 2. Foundations
- A. Coffer dams and pumping; getting satisfactory results at lowest costs.
- B. Handling difficult soils.
- C. Piles and pile driving; steam, air, and diesel hammers; using the pile driving formula.
- D. Precautions in test pile loading.

Part 3. Piers and Abutments
- A. Forms for concrete; importance of good carpentry.
- B. Placing and tieing of reinforcing steel.
- C. Placing of concrete; air entrainment.
- D. Winter work; insulated forms vs. heating.

Part 4. Steel Super-structure
- A. Shoes and rockers.
- B. Care in lifting beams and girders.
- C. Riveted and bolted connections.
- D. Welded connections.
- E. Painting.

Part 5. Concrete Super-structures
- A. Falsework; good plans and good construction.
- B. Anticipating dead load deflection.
- C. Curing of concrete.

Part 6. Bridge Floors
- A. Importance of uniform distribution of concrete.
- B. Machine finishing; advantages and problems.
- C. Control of floor elevations on super elevated sections.
- D. Curing.

We also, that winter, held a short course for contractors' supervisors of earthwork construction with the following outline:

Part 1. Opening Session
- A. Notebooks, texts, assigned reading, etc.
- B. The job of the supervisor; a daily goal.
- C. Plans and specifications.

Part 2. Engineering Fundamentals of Soils
- A. Classification of soils.
- B. Soil-moisture relationships-optimum moisture.
- C. Soil profiles-their use and limitations.
- D. The mass diagram and quantity profile.

Part 3. Embankment Construction
- A. Starting the fill.
- B. Importance of thin layers.
- C. Controlling the moisture content.
- D. Drainage; important every day of construction.
- E. When to roll and when to stop rolling.

The Author

Versatile Ohio "Prof" Out Front in Contractor Management Training

Emmett Karrer of Ohio's short-course fame has been with Ohio State University since 1946 as a professor of highway engineering.

As part of Karrer's wide background he was with the Bureau of Public Roads for 16 years. Since turning teacher, he has spent many off-months in the field, touring Central and South America to survey highway education needs for the International Road Federation, with a similar trip to assist the National University of Mexico.

Here at home, he has spent recent summers on consulting work for the Ohio Contractors Association, the very successful schools for contractor personnel being an outgrowth. Karrer's work recognizes that contractors' superintendents, foremen and engineers need more technical know-how in order to build today's highways, and that modern management techniques are vital to economical and efficient job performance.

Karrer also is director of the more broadly-programmed Annual Ohio Highway Engineering Conference. He is president of the Educational Committee of the American Road Builders' Association, and a member of the joint committee of the American Society for Engineering Education, and AGC's education for construction management.

Emmett Karrer

F. Wise use of good materials, as soft stone.

Part 4. Explosives and Rock Work
A. Cost of handling of poorly blasted material.
B. Kinds of explosives.

Part 5. Finishing
A. Keeping down costs.

Part 6. Capabilities and Limitation of Equipment
A. Bulldozers.
B. Bladegraders.
C. Scrapers.
1. Tractive effort—rim pull—power requirements.
2. Flotation.
3. Use of pushers.
D. Power Shovels.
1. Fundamental design—carriage, revolving superstructure, front end operating equipment.
2. Optimum working conditions—and costs of deviations therefrom.
E. Draglines.
1. Optimum working conditions.
F. Fueling and servicing of equipment.

Part 7. Production Cost Studies
A. Keeping meaningful records.
B. Stop watch studies.
C. Identifying the causes of lost production.
D. Eliminating the causes of lost production.

During the winter of 1960 we also held a bituminous concrete quality improvement seminar sponsored jointly by the University's Department of Civil Engineering and The Bituminous Concrete Producers Association of Ohio. The outline of this seminar was as follows:

Part 1. The Bituminous Concrete Industry in Ohio.
Part 2. Producing, Stockpiling, Blending and Feeding of Aggregate to the Plant.
Part 3. Drying of Aggregates.
Part 4. Screening, Storing and Proportioning.
Part 5. Types and Usages of Bituminous Materials.
Part 6. Design and Production of Bituminous Mixtures.
Part 7. Testing and Inspection Procedures.
Part 8. Trip through Bituminous Section of Ohio Department of Highways Testing Lab.
Part 9. Demonstration of Tests of Asphalt Cement and Bituminous Concrete. OSU Department of Civil Engineering Lab.
Part 10. Bases.
Part 11. Prime Coats, Seal Coats, and Surface Treatments.
Part 12. Transporting and Spreading Bituminous Mixtures.
Part 13. Compacting Bituminous Mixtures.
Part 14. Annual Dinner, BCPA.

Top Brass Next. By this time so many of the contractors' supervisory personnel had returned home with good reports on our short courses that the top contractors themselves decided that they wanted a short course. So, during the winter of 1960 we set up a 2½ day short course for top management for highway construction. This course outline was as follows:

Part 1. Management of Men
A. You and your men
What is supervision?
Do you know the people you supervise?
What is the common denominator?
What do employees want?
B. How do people get that way?
Why people behave as they do.
Heredity vs. environment.
C. What personality consists of
Definitions
Motivations
Drives
D. How your personality protects itself
Halo effect
Rationalization
Feelings
Danger signals
Your role
E. You too
Understanding self
You are different
Aggressive drive
What others expect of you
How do you measure up?

AUTOMOBILE MANUFACTURERS ASSOCIATION has made grants totaling $1,706,000 for the year to promote traffic safety and efficient use of highways.

Nearly one million dollars of this is for the Automotive Safety Foundation, a national organization providing financial aid and technical assistance for highway safety activities throughout the country.

Part 2. Management of Money
A. Corporate organization and control
Rights, duties, and obligations of staff men.
B. Financial management
Collecting and using financial data
Sources of capital
Internal financial operations
Financing of Equipment Purchases
C. Wage and salary administration
Problems of Equitable compensation plans
Wages, salaries and bonus payments
Pension plans and fringe benefits
Administrative controls of compensation

Part 3. Management of Machinery
A. The cost of lost production
B. Worthwhile records of equipment
The purpose of records
Methods of keeping records
Making use of your records
C. The role of top management in a safety program
The cost to you of unsafe practices
Safety campaigns vs. continuous safety
D. Insurance
What protection do you need?
What protection is available?

Another segment of the highway construction industry was served this winter in a short course for management of sales of construction equipment. Registration for this course was limited to sales managers or junior executives of equipment distributors firms. Here again we dealt largely with fundamentals of materials and resulting needs of equipment.

Through participation in the programs, members of the staff of the Ohio Department of Highways have become very much interested in this type of continued education and now have asked the University to work with them in setting up a series of short courses and seminars aimed specifically for the various groups within the highway department. Our first effort will be in the area of engineering fundamentals and will be planned for men at the field engineering level. Courses may also be added for other areas of interest.

Elected by Western Association of State Highway Officials: Forrest Cooper (Oregon), secretary-treasurer; Bryce Bennett (Idaho), president; Fred C. Quinnell, Jr. (Montana), outgoing president; T. Sherard (Alaska), new executive board member.

Self-Appraisal Theme at Portland WASHO Conference

During the Western Highway Conference, held June 14-24 at Portland, Oregon, someone remarked that the principal speaker was that guy who wrote the July Readers Digest article.

He wasn't far wrong. This sensationally written and highly distorted "expose" of the highway program was on the minds of speakers and delegates alike as the record-breaking conference got under way. It helped set the stage for the mood of self-appraisal that pervaded the general sessions.

A chief concern of all speakers representing national and broad administrative highway problems was that of maintaining and fostering the federal-state relationship that has worked so well up to the present. Speaking on this subject Ellis L. Armstrong, commissioner, U.S. Bureau of Public Roads, said in his opening address:

"In this basic federal-state relationship we in the Bureau must take the national viewpoint and try to adjust the sometimes divergent interests of the states. The states in turn must consider the viewpoints of the counties and other local authorities."

Armstrong referred to the very substantial progress in the present highway program by saying that "the price of progress is always trouble" (referring to the recent critics). "But actually for a program of this size, involving as it has so far about 50,000 contracts and directly in the program about 1½ million people, we have been remarkably free of mistakes and wrong doings." This defense against critics carried weight at Portland since it came from one in position to know the facts thus far obtainable on the accusations of program mismanagement.

"I'm convinced that careful, objective reviews of our program will continue to show that it is sound and is being competently administered, designed and constructed," said Armstrong.

Also taking the opportunity to make vigorous refutations, speaker B. D. Tallamy, federal highway administrator, commented at length on the July Readers Digest article. "Historic opponents of the highway program," he said, "have welcomed new members, recruited from the disgruntled, the misinformed, and

Continued on page 60

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CUT RESURFACING PREPARATION COSTS

...renew bridge decks with latex modified mortar

Here's how you can prepare and resurface structural concrete bridge decks in less time and at lower cost using portland cement mortar modified with Dow Latex 560.

Compare these savings. Conventional resurfacing methods require that you jackhammer out at least three to four inches of old concrete across the entire surface of the bridge and lay three to four inches of new concrete.

But when you're resurfacing with latex modified portland cement mortar, *only* the areas of actual failure need be jackhammered and sandblasted – and then only to a minimum depth of ½ inch, or to a depth sufficient to expose a sound concrete base. This thin layer of latex modified portland cement mortar has greater adhesion to substrate and produces a surface with greater flexural, tensile, compressive strength, greater resistance to water penetration, and higher freeze-thaw resistance than conventional concrete or asphalt resurfacing! It conforms to the expansion-contraction cycle of the original concrete, and reduces stress on the new surface.

Highway engineers, working with Dow research, have made field placements of latex modified mortar on bridges in Michigan, New York, Vermont, Texas, Ohio and several other states. For full information write for a technical report on how to apply latex modified portland cement mortar on structural concrete bridges and highways: THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales Department 1958EK8.

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WASHO CONFERENCE

Continued from page 58

those having some personal axe to grind. A good many of them are vicious and their motivation must certainly raise questions in the minds of neutral observers."

Administrator Tallamy noted that since the 1956 Highway Act set up the Interstate program, one-fifth of the Interstate system has been completed and more than 100,000 miles of highway construction in all has been accomplished. In four years, more federal funds have been put to work in the road program than in all the previous 40 years of federal-aid history.

The key importance of the state highway administrator today was noted in colorful language by another national highway leader on the program. Alf E. Johnson, executive secretary of the American Association of State Highway Officials, reminded the audience that the top highway administrator in each state would be expected to make a good account of his department's management, or face threat of losing his job. (See Washington News Letter, July Roads and Streets.)

The technical sessions of the WASHO conference were, as usual, strongly attended. Papers and discussions were heard on several score of subjects. Many of these were on such topics as electronic computer use, design, etc., but quite a few papers involved subjects of close concern to the construction engineers and the contractors.

For example, the paper by Charles W. Johnson, Materials and Testing Engineer, New Mexico State Highway Department, discussed "Compaction of Base and Asphaltic Pavements to Prevent Distress Under Traffic." This speaker pointed to the need for higher density requirements in pavement and base layers today than the contractors have heretofore been required to produce in many states.

Two engineers of construction, Arthur G. DeLong of New Mexico and E. G. Simpson of Washington reviewed the possible ways that "we can economize in the highway program." DeLong cited in particular the need for more study on ways to process inferior materials for subbases and bases. He also urged the study of entirely new types of surfaces. DeLong challenged the science of earthwork construction. by saying that actually there is sometimes little correlation between what the laboratory tests show and what exists out in the embankment. "Good field judgment remains the most important requirement for success in securing quality earthwork," he said.

Simpson said that in Washington state highway construction unit costs in 1959 were only 3 percent above the 1954 base, having come down sharply from 19.9 percent above that base in 1956. He credits this in part to strong contractor competition in bidding, but also attaches equal importance to a progressive clarification of policies and procedures that affect construction management.

These items according to DeLong include a continuing improvement in contract specifications, project preparation, design, use of materials, and department policy . . . "often influenced by a procedure of joint consideration by both contractors and highway engineers."

The specific areas of discussion and improvement under this contractor-engineering joint review in Washington have included getting the right-of-way details taken care of where they affect the job (cites for plant, material storage, waste material disposal); approved aggregate sources; better soils and foundation data; separation of contracts by classes of work (as against package contracts); pre-contract negotiation with utilities; approval of new materials, design ideas (such as pre-stressing) and equipment; end-results specifications on embankments; full width concrete paving; use of marginal materials through cement stabilization.

As usual at the Western Highway Conference a meeting was held by the Joint Cooperative Committee of AASHO and the Associated General Contractors of America. This group was particularly concerned with how the states will continue to schedule the available road jobs under the federal contract control.

The committee stressed the need for stronger and more active cooperation between contractors and engineers through local groups.

Payment for water and equipment use required for compaction, as a separate bid item, came in for discussion here. Considerable progress was reported in the western states toward making the method of payment more acceptable to contractors.

A hot topic at this session: the recent directive from the BPR placing a stiff penalty and fine on inspectors for violation of specifications. The directive was termed a silly, unrealistic one that would, moreover, "break a contractor if enforced."

This joint engineer-contractor group took up briefly the question of licensing contractors as well as requiring prequalification. This plan, advocated in some states, was not favorably considered. One objection was that it might give unions a strangle-hold on contractors. However, California representatives reported that licensing is "working fine."

Resolutions passed at the close of the Portland convention included the following partial list:

Overweight and oversize vehicle permit policy should be pursued via a recommended new committee in WASHO.

Continued decentralization of procedure of the Bureau of Public Roads was endorsed as bringing responsibility closer to actual projects.

State highway departments should be consulted more in the issuance of new or revised regulations by the Bureau of Public Roads.

Opposition to diversion of highway funds to finance rapid transit or other non-highway use was reemphasized.

New officers of the Western Association of State Highway Officials, elected at Portland, were:

President: G. Bryce Bennett, state highway engineer of Idaho, succeeding Fred C. Quinnell, Jr., of Montana.

Vice-president: J. C. Womac, state highway engineer of California.

Secretary-treasurer: Forrest Cooper, deputy state highway engineer, Oregon.

Executive committee additions: T. D. Sherard, director and chief engineer, Alaska division of highways; D. B. Dixon, chief highway engineer, New Mexico; Joseph J. Marsh, highway commissioner, Colorado; Ernest J. Ketcham, chairman, Washington state highway commission.

Newest Interstate route to be completed in CONCRETE...

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This is one Interstate System highway that won't be wearing detour signs! Only concrete has load-bearing strength that can be computed *mathematically* to match future traffic. Only concrete enables engineers to design highways to last 50 years and more!

There are no "moving parts" in concrete to cause hidden wear. And even under the highest temperatures concrete doesn't get soft. Traffic can't push its solid surface into ripples and washboards.

Concrete can't oxidize . . . there is never any adverse chemical reaction to sun, cold, air or moisture. So it doesn't dry out, lose strength and need expensive surface build-up treatments every few years. Then too, concrete actually grows stronger year by year.

All these engineering and material advantages of concrete add up to built-in thrift. Exceptional pavement life—and upkeep costs that will run as much as 60% lower than for asphalt. That's why you can look for more and more Interstate routes going concrete all the way!

Concrete saves 69% on upkeep during first 3 years on Oklahoma Test Road. Oklahoma laid connecting two-mile sections of concrete and asphalt, the best of each type. Exact records of all pavement upkeep costs show, three year total per mile: concrete, $229.98; asphalt, $745.11. So far concrete has actually saved $515.13 per mile!

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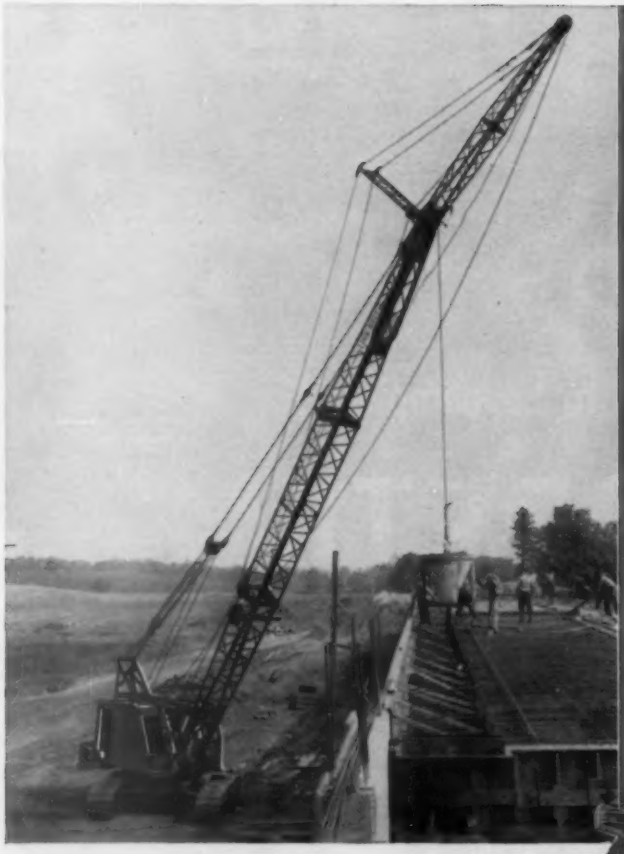
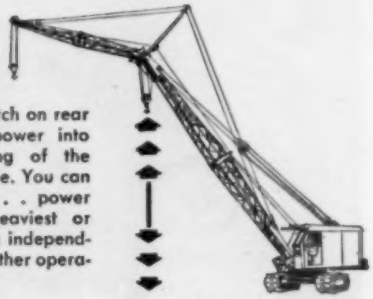
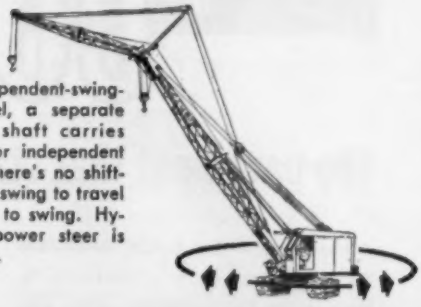


1 POWER UP OR DOWN MAIN LOAD LINE

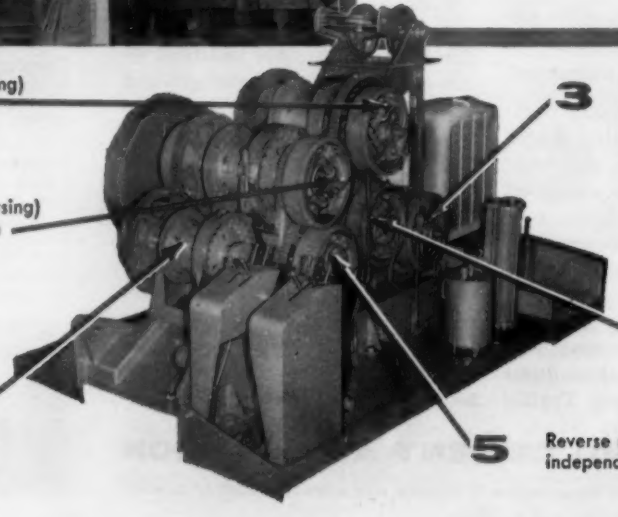


Reversing clutch on rear drum puts power into load lowering of the main hoist line. You can power up . . . power down the heaviest or lightest loads independently of all other operations.

4 SWING RIGHT OR LEFT



With independent-swing-and-travel, a separate reverse shaft carries power for independent travel. There's no shifting from swing to travel or travel to swing. Hydraulic power steer is standard.



1 Load lowering (reversing) clutch for rear drum

2 Load lowering (reversing) clutch for front drum

3 Boom lowering clutch

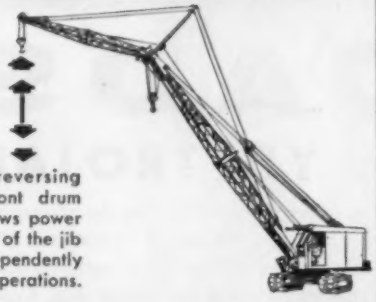
4 Reverse shaft for independent swing

5 Reverse shaft for independent travel

6 Independent third drum

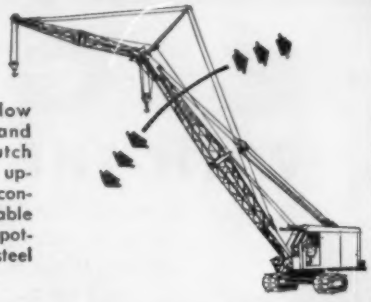
independently!

2 POWER UP OR DOWN SECONDARY LOAD LINE



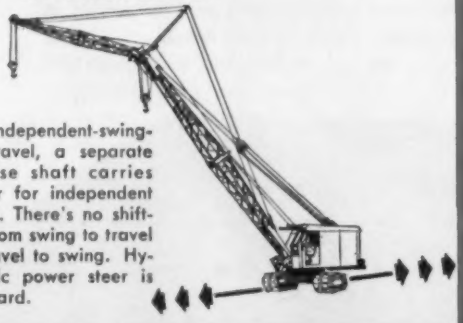
Exclusive: a reversing clutch for front drum also . . . allows power load lowering of the jib whip line independently of all other operations.

3 HOIST OR LOWER BOOM UNDER POWER



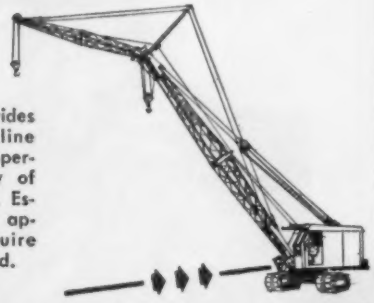
Independent high-low speed boomhoist and boom lowering clutch provide fast, safe up-and-down booming control. Especially valuable for high-accuracy spotting jobs such as steel erecting.

5 TRAVEL FORWARD OR BACKWARD



With independent-swing-and-travel, a separate reverse shaft carries power for independent travel. There's no shifting from swing to travel or travel to swing. Hydraulic power steer is standard.

6 OPERATE INDEPENDENT THIRD DRUM



A third drum provides one more load line which, again, is operated independently of all other functions. Especially useful for applications that require "snaking" in a load.

Link-Belt Speeder's years-ahead Full-Function Design is standard on all models up through the 40-ton "108" Series. Because of this exclusive design concept, your operator can have completely independent control of *all* lifting or excavating applications. He can power individual load lines up or down, crowd or retract, swing and travel, boom up or down — all individually, or in any combination, depending on the job.

And only those components he puts in use are under load; all others revolve freely on anti-friction bearings. This design practically *doubles* machinery life. Get the complete Full-Function Design story from your distributor. Or, write LINK-BELT SPEEDER CORPORATION, Cedar Rapids, Iowa. 106-60N

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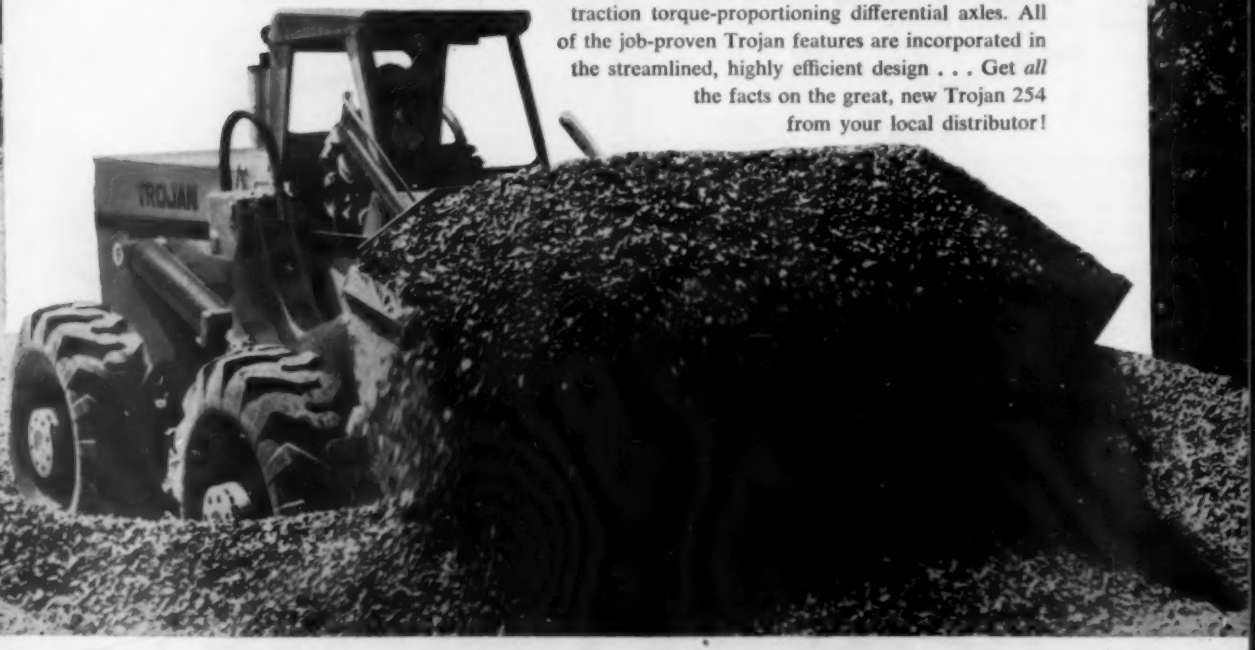

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Quality Control in the Highway Program
One of a Series

Test rolling a completed subgrade on a route I-85 project in North Carolina. Note the two inspectors walking along with eyes on the tire paths. The plastic tarpaulins were placed to help maintain a constant moisture content (and weight) for the sand ballast.

Subgrade Weak Spots? Proof Rolling Finds 'em in North Carolina

The term "proof" stands for more than bourbon in North Carolina these days. It applies to the practice of proof or test rolling subgrades or subbases on state highway projects to determine any lurking weak spots before acceptance. This rolling, required as the engineer directs, is done after the construction specifications have been fully complied with.

Following a period of trial as a special provision or a supplementary contract item, proof rolling was embodied in North Carolina's new standard specification book (April, 1959). Section 36 spells out the proof rolling in considerable detail,

A shoulder drain being installed along a section of finished grade on the North Carolina project here described.

saying specifically that this item "shall consist of furnishing and operating at the Engineer's direction heavy pneumatic tired compaction equipment for compacting and testing for stability and uniformity of compaction the subgrade, subbase, and soil or aggregate base course or other areas which the Engineer may direct."

This specification is not intended to limit the use of heavy rubber tired compactors just to proof rolling, but it does require that such a roller be available for this purpose. In actual practice on major arterial projects, particularly Interstate jobs, the North Carolina engineers have insisted on proof rolling at least the complete subgrade before acceptance.

An example is the project here pictured, that of Thompson-Arthur Paving Co., of Greensboro, covering a segment of Interstate 1-85 north of Durham. As a result of proof rolling the complete template grade along one of the dual roadways in this 11.5-mile job, change orders were issued requiring over $200,000 expenditure for subgrade drainage. The need for this drainage had not been anticipated, and wouldn't have shown up immediately under ordinary compaction procedures.

The weaknesses looked for in proof rolling may stem from any of several causes. The material may be found insufficiently compacted. Areas of poor material may show up. Or wet, springy spots may indicate need for better drainage. In any event, the inspectors look primarily for evidence of excessive resilience or rutting. Considerable depression with surface cracking immediately around the tires means trouble to the inspectors.

A point of particular interest in the North Carolina procedure is the inspection vigilance. One and preferably two inspectors walk alongside or immediately behind the compactor, with their eyes on the tires and tire paths.

Proof rolling is done only when a qualified inspector is present, and complete records of the rolling are kept and the conditions indicated. This inspector, assigned by the Resident Engineer, has the power to approve or disapprove the subgrade, supervise correction, etc.

The test rolling equipment is specified to consist of four heavy rubber tired wheels mounted in a single axle line on a rigid frame. The four evenly spaced wheels must be independently mounted so as to carry approximately even loads when operated over uneven ground. The maximum spacing between wheel centers is 30 in. This leaves about 12 in. clear space between tires, so that successive staggered passages create a slight overlap of surface coverage.

A suitable body is required for ballasting to provide gross loads between 25 and 50 tons as the Engineer directs. The specifications leave it open for the contractor to substitute some other type of rolling vehicle of equal or better effectiveness, with written permission of the state's chief engineer.

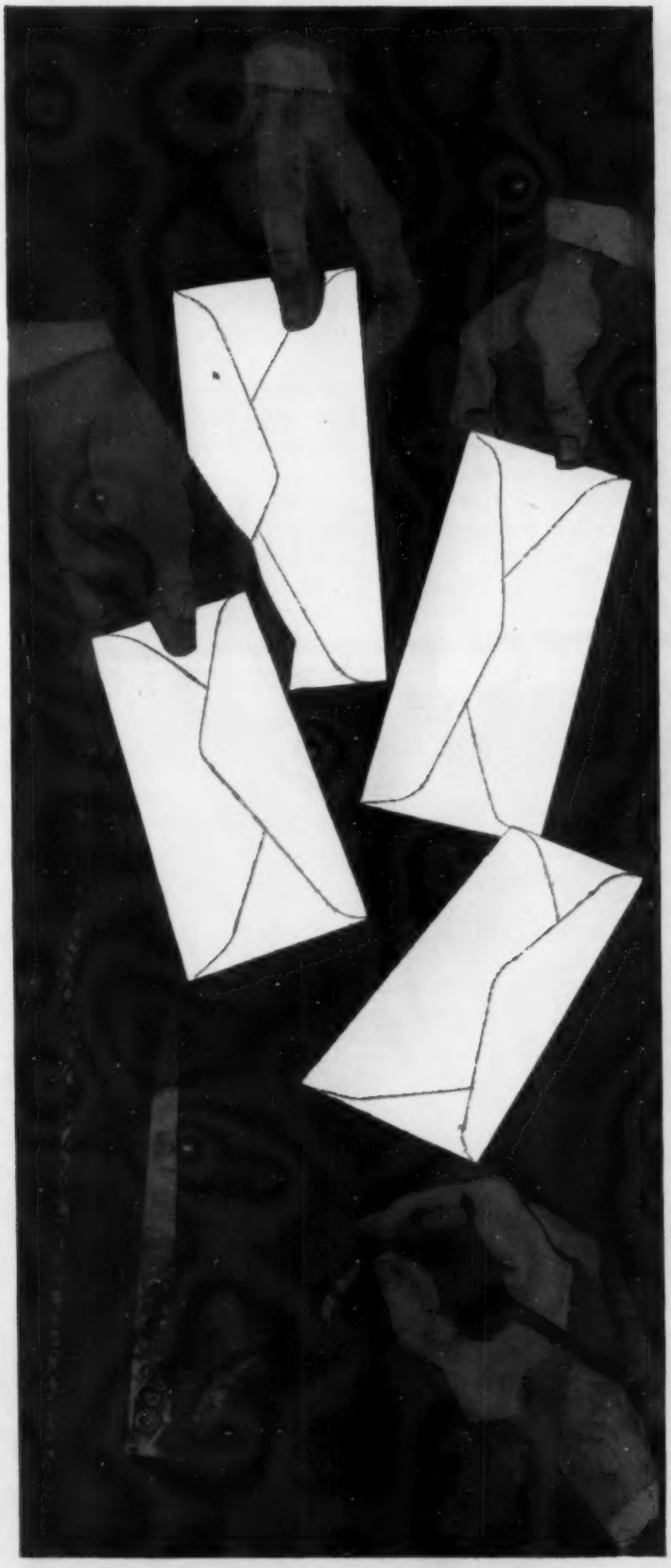
Tire pressure is an important detail in the testing. Pressure ranges are specified between 60 and 150 psi, and 90 to 95 percent of the tire volume is to be filled with liquid. The contractor must furnish the engineer with charts showing the contact areas and contact pressure for the full range of inflation pressures, and for the full range of loadings for the particular tires used.

Ballast for the compactor is also subject to specification control. Iron pigs, sand bags or other units are specified that can be readily checked for weight accuracy by the engineer. Ballast must be on hand for weighting up to the full 50 tons maximum if considered desirable.

For subbase or base courses, rubber-tired tractors are required. For subgrade testing, a crawler tractor is permitted. Ability of the compactor and tractor to make a 180-degree turn on a 27-ft.-wide grade is one other detail considered essential and so specified.

The subgrade and (if involved) the base course must be prepared and compacted in accordance with the specifications including density.

Continued on page 70



How to be sure you make the right choice after the Rock Salt bids are in

FIRST consider the company behind the product. What is its reputation, who does it serve, what are its resources? In terms of reputation, service and resources, the Morton Salt Company is the leader in the industrial salt field. Morton's outstanding reputation has been built on years of service to industries and municipalities throughout the United States. Now Morton, America's only nationwide salt company, can offer rock salt for ice control to users everywhere in the country from conveniently located salt sources and warehouses. And Morton numbers among its rock salt customers hundreds of towns and cities and many of the nation's counties, states and toll roads.

NEXT satisfy yourself that the bidder can keep his promise. Make sure he can deliver rock salt from a source near you, the fastest and most economical way. To better serve rock salt customers in the East and Midwest, Morton recently opened a giant new rock salt mine strategically located at Fairport, Ohio. The storage, loading and transportation facilities at the Fairport Mine, like the facilities at other Morton sources, insure you prompt delivery on whatever quantity of rock salt you order.

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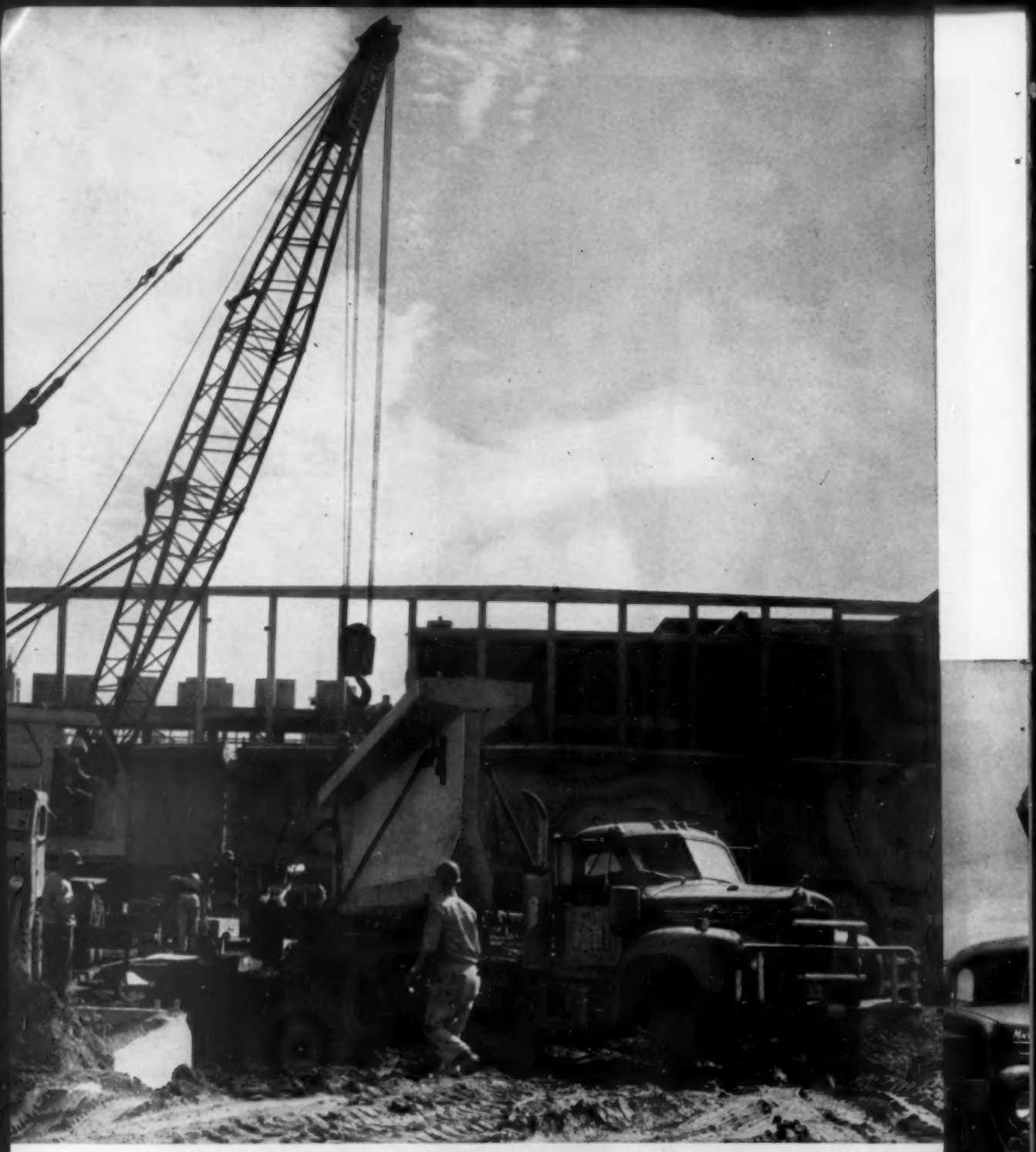

Construction of new skating rink at the University of Alberta calls for use of huge precast concrete girders. B Model Mack positions the heavy beam under the crane for unloading. Mack steering and braking systems give quick, sure handling under difficult conditions.

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Multi-million dollar construction project involving runway extensions on the Namao Airport near Edmonton, Alberta, found Macks working 'round the clock to beat winter weather. Dependable, trouble-free performance is expected and received from Mack trucks no matter what the job.

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Mack performance pays off on everything from

rinks to runways

On construction jobs of all kinds, experienced contractors are Mack boosters. Most trucks just can't provide the stamina and economy needed for month-in, month-out heavy-duty service under severe operating conditions.

Experienced operators continually prove that solving the problem of high costs calls for quality equipment. Mack quality begins with Mack-built major components—front and rear axles, engines, frames, transmissions and brakes—which are made to the highest standards in the industry. It appears in special Mack features like the exclusive Balanced Bogie with Power Divider for positive traction over any terrain . . . and extends to Mack cabs, which offer the utmost in driver vision and comfort, easy access to all working parts, and minimum upkeep requirements.

You'll find that Mack quality construction shows up in every phase of operation—and where it really counts, in net profit figures. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario.

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Then follows the further compaction with the test roller.

The first step is to give the subgrade section two or more complete "coverages" with the compactor. This term is defined as meaning that stage in the rolling when the entire width of the grade has been passed over by a roller tire. The roller's speed is between 2½ and 5 mph and effort is made to maintain the same speed as well as tire pressures throughout a given test operation, to eliminate variables in judging the subgrade's condition.

After the second coverage is made, if the engineer sees signs of developing weaknesses, a third coverage is ordered. Should suspicious conditions warrant it, test borings are made and the samples studied for moisture content and other conditions. Or, pits may be dug with a backhoe to facilitate more complete inspection to find the reasons for non-uniform stability.

The specifications require that the contractor correct unstable areas by any of the following means:

1. If the quality of the soil is found acceptable and the instability of the subgrade is due to high moisture content, the soil may be ordered aerated, recompacted when drier, and again test rolled. No payment is made for drying the soil.

2. If the soil is found to consist of material high in organic matter, mica or other objectionable material whose instability is not due to moisture content alone, the material must be removed and replaced with satisfactory material. Following recompaction, test rolling is again done for final acceptance. The material removed is classified and paid for as Unclassified Excavation, and the replacement material paid for as Borrow.

Base courses are proof rolled in essentially the same manner and with the same provisions for correction.

Payment for proof rolling is made by roller-hours. No payment is made for idle equipment due to repairs, servicing, loading or unloading ballast, changing tire pressures, bad weather, wet subgrade, or standing by. Just hours of actual rolling.

The unit bid price for such rolling for the Thompson-Arthur project was $50 per hr. The price has ranged from $15 to $50 on recent North Carolina projects. It is not known exactly how much this new requirement may have upped the bid price for grading and base construction. The difference if any has reportedly not been great, and the procedure has the whole-hearted approval of the North Carolina state engineers and the understanding and cooperation of contractors.

The test rolling has been more than just a construction tool. It has added to the knowledge of the engineers in soils and road design. The drainage required for the Thompson-Arthur project, for example, represents a revised approach. These drains consist of 6-in. helical corrugated metal pipe, perforated at the under quarter points. The drains are set in herringbone or transverse position in the subgrade. The chief "new" details are two: one is that the need for the drains was discovered during construction, rather than after the road had begun to carry traffic and to develop untimely defects. The other is that such drains are now often set deeper than was formerly considered necessary. On the Thompson-Arthur job the depth is 5 to 7 ft. below bottom of pavement, compared with 3 to 5 ft. usually specified for subgrade drains in the past. The heavy compactor, with high tire pressures simulating the severe conditions of a modern arterial highway, produced a pumping action here that necessitated deep drains for effective correction.

This better understanding of drainage needs is now expected to lead to extensive use of drains in connection with widening and resurfacing existing roads in North Carolina.

Court Decisions for Contractors

Overtime Work on "I" Job

Suit by the Secretary of Labor for the recovery of overtime wages of a workman allegedly engaged in interstate commerce was recently before the U. S. Court of Appeals. This workman had been directed to supply fill dirt for the construction of improvements to the interstate system near Baltimore.

Assigned to the work of hauling fill dirt he later operated a bulldozer, leveling the loads of earth dumped by others. In their defense to the action the employers contended that the worker was not engaged in commerce or production of things for commerce.

Holding this work within the overtime provisions of the Fair Labor Standards Act the court said, "The test is whether the work is so directly and vitally related to the functioning of the instrumentality or facility of interstate commerce as to be in practical effect a part of it, rather than an isolated local activity.

"Repair of facilities of interstate commerce is activity in commerce within the meaning of the Act and we think, the work of improving existing facilities of interstate commerce involved in the present case, falls in the same category.

"Hauling fill dirt to a road site and leveling it there is 'so directly and vitally related to the functioning of an instrumentality or facility of interstate commerce' as to be in practical effect a part of it.

"We are of the opinion that when this employee hauled fill dirt from the borrow pit to the construction site he was engaged in the construction of goods for commerce. An employee working in the production of amesite, a bituminous concrete road surfacing mixture, was held to be engaged in the production of goods for commerce. An employee who quarried stone and used it to make cement, which his employer hauled to interstate roads was likewise considered so engaged. Like amesite and cement, which constitute the surface, fill dirt which becomes the subsurface, is used in road building.

"We fail to discover any differences warranting a legal distinction whereby, while the former products fall into the classification of goods for commerce, the latter product does not."

Mitchell v. Emala & Assoc., (C.C.H.) 39 Lab. Cases 68,981, January 7, 1960

Tellurometer on ground station in Mississippi highway location work.

Mississippi Engineers Report Tellurometer Test Results

Two years ago, *Roads and Streets* carried a report on the first use of a new highway surveying method, being tried out to speed mapping for location of several hundred miles of Interstate routes in Virginia. At that time, Bureau of Public Roads officials were predicting that the technique, which utilizes high-speed micro-waves to measure distances and largely replaces triangulation or highway traverses, would save thousands of dollars in preliminary engineering costs. Even more important, it might greatly reduce the time required to bring a project to the awarding stage.

To test the adaptability of the Tellurometer System for highway work, the Bureau sponsored research in three different state highway departments.

At the Highway Research Board meeting in Washington, D. C., several of these states reported results of their field testing over an 18-month period. The tests generally bear out what was predicted two years ago. They reveal this system as another of those decisive advances in engineering technology which were stimulated by the urgency of getting the Interstate program under way.

One of the reporting states was Mississippi, where the state highway department established control for 439 center-line miles of new roads in 218 working days during 1959, using the Tellurometer for distance measurement. Here is a quick summary of the Mississippi results, as reported by H. H. McBride, field operations engineer.

- Actual traverse distances measured totalled 845 miles, an average of 3.87 miles per day. A total of 2,555 points were occupied, 872 of which were chaining points. Thus, the Mississippi survey team established nearly 12 stations per day, or 1½ per hour.
- Accuracies obtained were well within the second-order requirements for location mapping. They averaged 1:22,000, with some closures ranging up to 1:707,000. Although this is potentially a first-order instrument, officials found, the method may be relied upon for good second-order accuracy "under all operating conditions."
- Use of the micro-wave system cut costs by more than 50 percent, reducing the cost of controlling the 439 linear miles to $245.74 per mile from the $589.18 per mile reported by conventional methods.

The Mississippi highway engineers also developed a program through which their field computation could be made on an IBM 650. Referring to this adaptation, McBride reported that it has "cut our computation time greatly and our computational errors to a minimum."

Some of the field operating procedures developed by the Mississippi Tellurometer crew drew considerable attention at the Highway Research Board meeting. Because an attempt was made during the 13-month testing period to pit the new method against many kinds of field conditions, a number of challenging problems were encountered.

In establishing horizontal control for a stretch of proposed Interstate route in Mississippi, surveyors usually were able to start working off of existing stations set by the U. S. Coast and Geodetic Survey, not too many miles away from the route area to be mapped. The procedure then was merely to run a simple traverse up the length of the proposed route, putting in stations as close as required, and tying into other available U. S. C. & G. S. stations. This amounted to stations every 4,000 to 5,000 feet and picture point controls every 2,100 feet. Permanent stations were set every two to four miles down a traverse.

Operating procedures were standard. A master unit set up over one station transmitted a series of high-speed impulses to a remote unit at the next station down the traverse. The time which the micro-waves took to make the round trip from master to remote and back was indicated on a cathode ray dial on the instrument panel of the master.

To obtain second-order accuracy, the Mississippi party took two coarse and 12 fine readings.

T. J. Kennedy, BPR engineer in charge of liaison with the three states testing the Tellurometer, made spot checks of the time the party required to set up their instruments and measure a line. It varied from 12 to 15 minutes.

As in other parts of the country, the Mississippi party encountered certain perplexing phenomena that hampered operation of the electronic system.

• They found that under certain operating conditions (such as taking a reading in a deep railroad cut) certain frequencies tend to "drop out." These readings have to be omitted and other frequency steps are read. The instrument will operate on 20 different frequencies.

• It was almost impossible to obtain a reading through a line of traffic, and it was necessary to elevate the instrument at one or the other end of a line so the microwaves could clear this kind of obstacle.

• High winds are very bad for Tellurometer operation because the movement of vegetation near the units made it difficult to obtain readings. It was necessary to clear tall grass around the units for a radius of 50 ft. on one occasion. Wind blowing trees along the measuring course did not appreciably affect the readings, however, although the motion of pine needles made some readings difficult.

• Temperature was apparently not a problem; the party operated successfully in temperatures ranging from 16° F to 93° F. (Engineers at both ends of a line must take temperature and barometer readings. And because these atmospheric conditions affect the speed of the radio waves, it is necessary to make simple adjustments in the computations.)

• The Tellurometer system was tested over a variety of topographical conditions and through industrial areas, thickly populated sections, densely wooded areas, heavy undergrowth swamp areas, and farm land. Although operators did not have to be within sight of each other, it was necessary to have a clear "line of sight" for the microwaves to travel between stations.

Under such a variety of conditions, the Tellurometer technique apparently passed the requirements of the state highway department. Concluding his report on the operation, McBride said, "There is no doubt in our minds that the Tellurometer is ideally suited for highway work. Speed of survey has been vastly increased while cost has been greatly decreased."

MICHIGAN'S DIVIDED FOUR-LANE HIGHWAYS passed the 900-mile mark recently when a 20-mile section of Interstate 94 freeway was opened from Albion to Battle Creek.

AASHO Acts on Job Quality Controls

A Special Committee on Project Procedures to develop "guide lines" for obtaining effective supervision of highway projects and for "getting a double-check on materials, sampling and testing" has been appointed by David H. Stevens, President of the American Association of State Highway Officials.

The new committee will recommend procedures for "obtaining high type quality control of work" in order to minimize "human failures" in the conduct of a highway project.

Serving with Mr. Stevens on the new committee are the following state highway officials: D. H. Bray, Kentucky (first vice-president, AASHO); J. Burch McMorran, New York; Howard S. Ives, Connecticut; T. C. Robbins, Mississippi; A. B. Cornthwaite, Virginia; John Swanberg, Minnesota; Rex M. Whitton, Missouri; D. C. Greer, Texas; and W. C. Williams, Oregon.

Special subcommittees which will work with the Special Committee include:

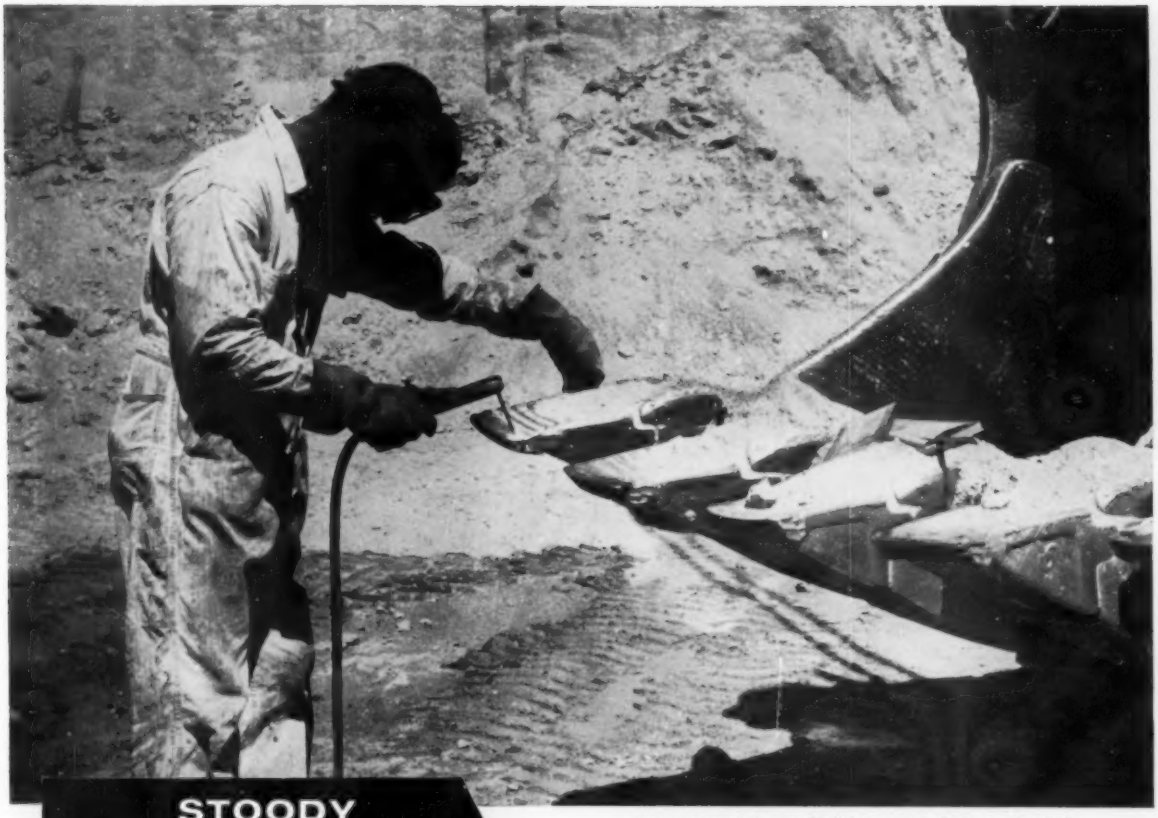
Paving Type Determination and Documentation: Howard S. Ives, Connecticut, chairman; M. L. Shadburn, Georgia; John E. Meyer, Michigan; and J. C. Womack, California.

Grading and Minor Structures: W. C. Williams, Oregon, chairman; Vaughan M. Daggett, Maine; E. M. Johnson, Mississippi; and L. M. Clauson, Iowa.

Flexible Pavements: A. B. Cornthwaite, Virginia, chairman; Otto Fritzsche, New Jersey; R. E. Bradley, North Dakota, and W. A. Bugge, Washington.

Rigid Pavements: Rex M. Whitton, Missouri, chairman; William R. B. Froehlich, Pennsylvania; D. H. Bray, Kentucky; and Mark U. Watrous, Colorado.

Channels of Project Supervision: D. C. Greer, Texas; chairman; Harold L. Aitken, District of Columbia; George E. White, Jr., West Virginia; and John Swanberg, Minnesota.



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STRINGER BEADS *of Stoody 121 and Stoody 100 applied semi-automatically keep buckets in good condition.*

Usual maintenance procedures just couldn't keep buckets and teeth in shape on this job...wear was too severe. The answer was found in the semi-automatic welder applying Stoody 121 and Stoody 100 to bucket lips, sides, and runners, and to teeth and adapters.

But even then, teeth needed additional protection. To keep them digging efficiently, points were treated twice a day with several beads of Stoody Tube Borium, using manual electrodes. Tube Borium is the "last word" for protecting earth-working equipment where the going is toughest. A few beads virtually form a layer of pure tungsten carbide—your assurance of maximum wear.

Have you investigated the semi-automatic welder and Stoody hard-facing wires in your own operations? Stoody dealers (consult the "yellow pages" of your phone book) are glad to demonstrate the machine in your own plant. Write for details.

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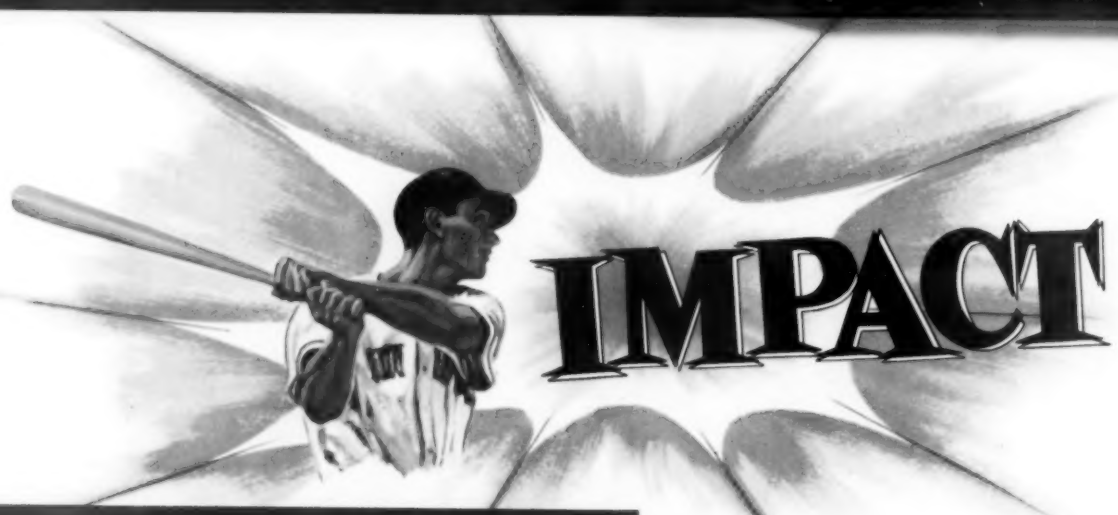
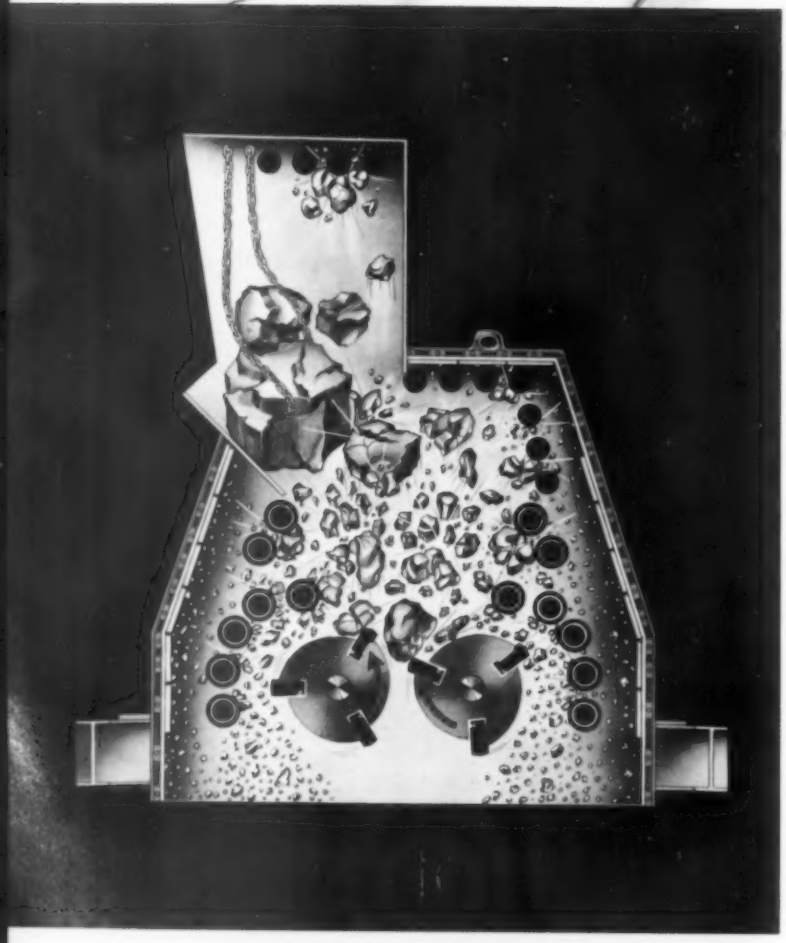




Here's the Sultan of Swat when it comes to breaking rock with scientifically engineered *impact*. A Cedarapids Double Impeller Impact Breaker gets your operation out of the bush league and into the Majors in profit. It scores with high tonnage production in every inning. It up-grades the finished product into the fine cubical shape that wins the specification pennant. With its 40 or 50 to 1 reduction-ratio batting average, there's less need for pinch hitting secondary crushers. And you'll pitch more money into the bank with a low earned run average in maintenance costs.

In the clutch, drive in the winning production run with a Cedarapids Single Impeller Impact Breaker.

This is Cedarapids'
TRUE CONTROLLED IMPACT ACTION
that keeps you in the competitive ballgame!

The tremendous clout delivered by the COUNTER-rotating impellers drives the rock into deep center where it smashes into incoming rock dropping rapidly from the high angle feed. With 50% of rock breaking against rock in suspension, manganese wear is sharply reduced. The *counter* rotation of the impellers also pulls line drives right and left to the adjustable breaker bars which are strategically positioned to field the broken rock and fire the desired sizes to the discharge opening. The finished cubical specification product is the result of Cedarapids *true* impact.

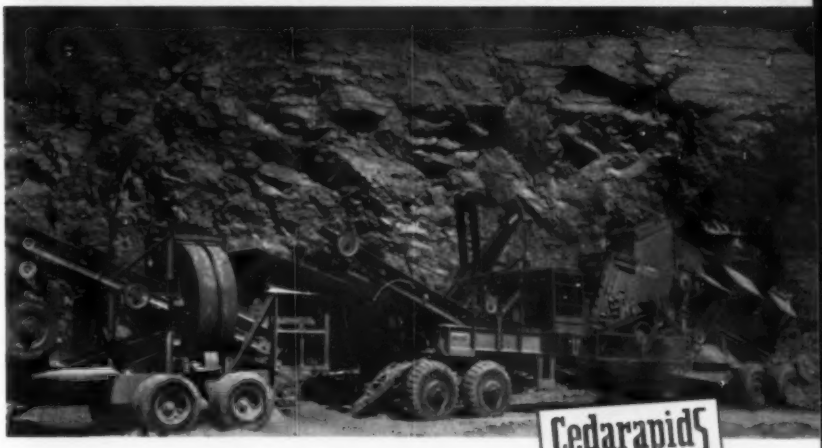
Doubles or Singles will score more productive runs when they're

CEDARAPIDS IMPACT BREAKERS

Cedarapids
Built by IOWA

This Double puts profit in scoring position. It's a Cedarapids 3645 Double Impeller Impact Breaker batting around .300 in tons per hour in this stationary plant installation. Six models give you the capacity range you need.

A Single Impeller Impact Breaker is as effective as a single to right field with the bases full for primary breaking or when conditions require an economical intermediate breaker between your primary and secondary. Two sizes available for portable or stationary application.



Fast on the base paths! It's a 100% portable Double Impeller Impact Breaker. From your first job you can streak to second, then third . . . and slide home with the profits. Two sizes, on wheels, keep you in position to score with fewer between-job delays.

Cedarapids
Built by IOWA

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa

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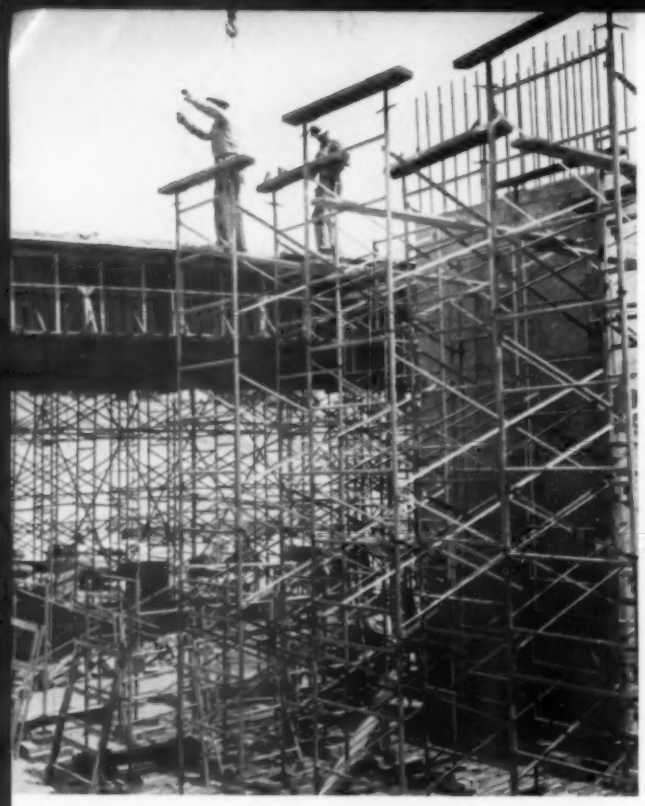


(Left): Heavy caps and jacks atop the towers are being placed by a truck crane. Frames are all passed up by hand, sometimes with the aid of a rope. (Right): One of two Austin-Western hydraulic cranes, with a specially built "pulpit", used for stripping operations. Worker on 5′ x 6′ platform is secured to the railing with a safety line.

TUBULAR SCAFFOLDING

Continued from page 46

doesn't usually present these problems—at least in this magnitude."

Both Fischer and Shimmick noted that a structure with an appreciable super-elevation can likewise cause grey hairs if the crew tries to handle the job without resorting to timber.

"The limiting factor here is the size of the tower and the range of adjustment in the screw jacks," explained John Shimmick. "If you're using a 4′ x 10′ tower and have an adjustment range in your jacks of 10 in., you're going to do some careful calculation and erection on a structure where the pitch or fall approaches 10 in. in 12 ft. This is one of those instances where it might be quicker and easier to work with timber. And the closer you get to a situation like this, the more exacting you have to be in setting your first frames of each tower. Whenever you're working to within an inch of the differential between your jacks, you've got to be close in your pad and tower calculations."

Larry Fischer pointed to a crew spotting tubular steel falsework pads preparatory to deck work of one of the interchange's major structures.

"Our first move is to bring in a grade point from one of the nearby grade stakes. Then, with the wooden pads spotted, we note the elevation of each and mark it on the pad. John Shimmick shoots all this himself—we don't want to have to wait for an engineer."

Using the soffit elevations shown on the falsework drawing and the elevations of each of the pads, John Shimmick quickly figures frame sizes to be used in building the towers. He keeps his penciled tabulation with him on the job for constant reference.

Frame handling has been simplified, speed and made far safer by building frame racks that can be straddled and carried by a Ross carrier. The benefits which the Kiewit organization find in handling the frames in this fashion are worth noting:

(1) The timber racks can be moved quickly into tight places, then left for loading or unloading at the convenience of the falsework crew.

(2) Separate racks used for different frame sizes simplify handling and provide flexibility.

(3) The frames are handled only when they're being stacked on their respective racks during stripping.

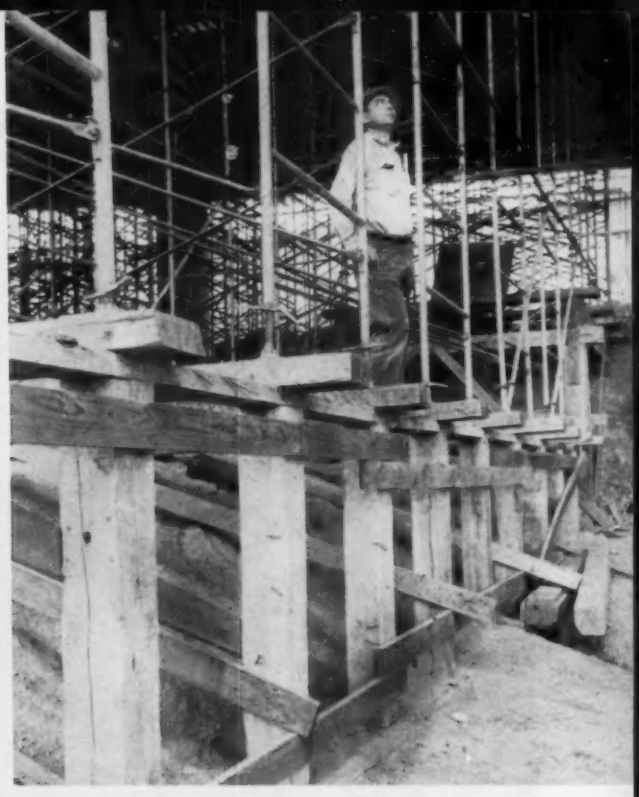
(4) The chance of accident from falling frames has been virtually eliminated.

(5) Damage to frames from handling has been eliminated.

(6) Job clean-up is speeded because frames are racked as they're taken down.

Once the pads are spotted, the elevations noted, and frame sequence for the respective towers determined (tower sizes are shown in the falsework drawing), the Ross carrier brings in the frame racks and the falsework starts to take shape.

"Our falsework drawing shows us the size of tower—4′ x 4′, 4′ x 7′ or 4′ x 10′," states Shimmick. "We determine the size of frames to use. The first frames making up the bottom of each tower are plumbed by



(Left): Worker hand level plumbs the bottom tower section as the all-important first step. (Right): Larry Fischer points to bent as an example of use of timber framing under the tubular frames where ground profile is uneven.

screw jacks and hand levels. We will usually level a whole section of as many as 30 towers before we start building up. Then they move ahead quickly."

The steel frames are handed up as the towers rise. When the tower moves higher than 18 ft., workers haul the frames up with a rope both as a safety precaution and as a method of speeding erection. The only time cranes or gin poles are used is in the placing of the cumbersome 6" x 8" caps and jacks after the towers are complete.

"Supervision has to be close," notes Shimmick. "If you get the wrong frame in a tower, you may not find the mistake until the tower is finished. You can't go up and whack a little off, or scab on a little. You take the whole thing down—crossbracing and all—and rebuild it."

Making cap jack adjustments for the soffit elevation is done in two stages. After the towers are crossbraced for rigidity, and the caps and their attached jack screws are in place, a rough "grade" is established by Shimmick's crew under his direction. This will turn up any errors made in the size of frames used in the towers before heavy timbers and forms are in place. Final adjustments are made at the direction of the Highway Division's survey crew.

Aside from the Ross Carrier, the only major unit of construction equipment used by Kiewit in handling the falsework is an Austin-Western 220 crane, modified with a specially built pulpit for use in stripping.

"We have two of these cranes," remarks Larry Fischer. "Both have a special operator's stand that we designed for use on the end of the boom. With a four-man crew—one of them riding the pulpit—we can strip this falsework in short order and still handle the ma-

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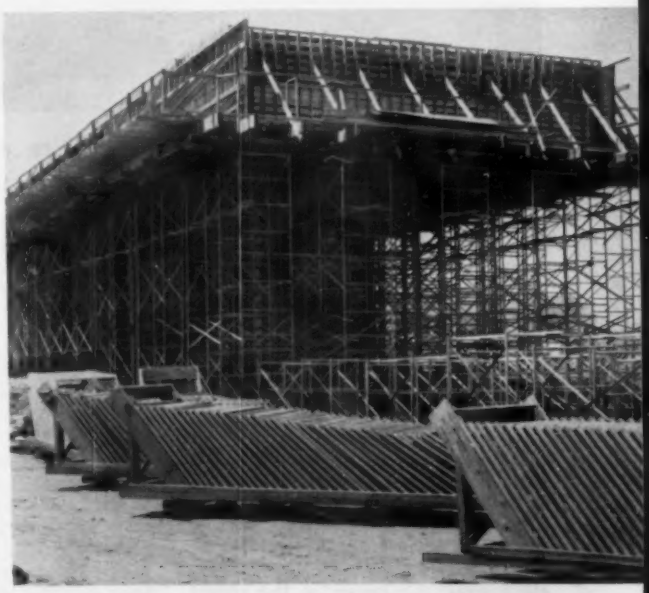

A Ross carrier brings wooden racks of falsework frames to the job as needed. Racks are placed close to falsework to eliminate handling time.

Faster, more flexible hydraulic machines

HYDRAULIC SELF-WIDENING SPREADER-FINISHER WITH DIAGONAL SCREED SAVES BIG MONEY ON RAMP WORK

Actual savings up to $450 a day in overtime (500 batches placed in 8 hours instead of 10) have been reported by contractors who are using the Jaeger 12′-18′ all-hydraulic self-widening Spreader-Finisher with diagonally adjustable screed.

The only efficient machine for interchange paving. The Jaeger adjusts both traction wheels and spreading screw shaft by infinite hydraulic width changes for any flare from 12′ to 18′, without stopping. Metering screed adjusts by hydraulic power to any angle needed to insure positive concrete placement against the higher form on super-elevated ramps or crown of road. On curves, the crown of the screed can be raised or flattened by turn of a ratchet lever. Dual spreading screws are also hydraulically powered — are speeded up, reversed, raised or lowered by the mere touch of levers.

WIDTH FLARED FROM 12′ TO 18′ ON THIS INTERCHANGE: →

Hydraulic self-widening Jaeger Type JSX Spreader-Finisher, equipped with 12′ screed plus 36″ screed extensions *with infinitely adjustable end shoes at both ends*, laid all widths. Screed angle was hydraulically adjusted to changing super-elevation on the ramps.

For complete catalog, prices and delivery on any of these machines, see your Jaeger distributor or write us.

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HYDRAULIC-SMOOTH PAVING MACHINES

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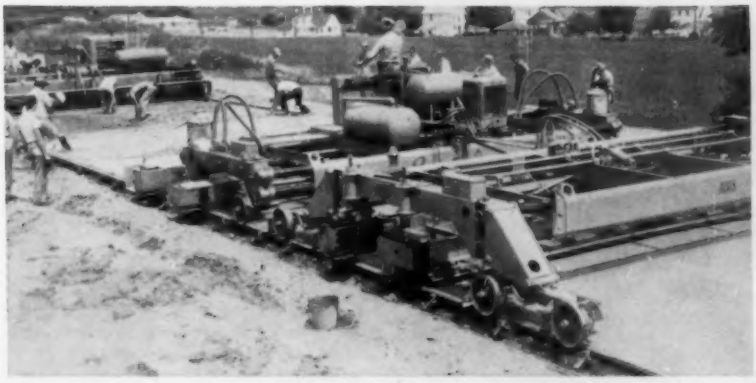
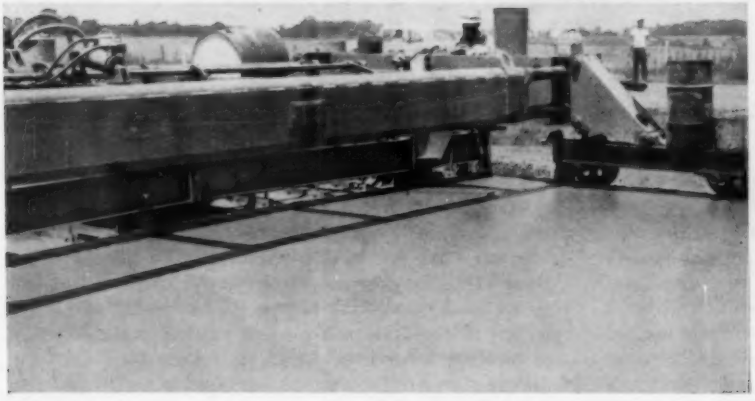




2 OPERATORS LAY SUPER-SMOOTH SLAB WITH 4-SCREED JAEGER TEAM

One man on 20′-26′ Spreader-Finisher remixes and spreads the piles with twin hydraulic screws, and strikes off base for mesh. On top course he also makes first finishing pass with 12″ oscillating screed — *all in one operation.* (For high production work, another Jaeger Spreader, without screed, is used ahead to place base.)

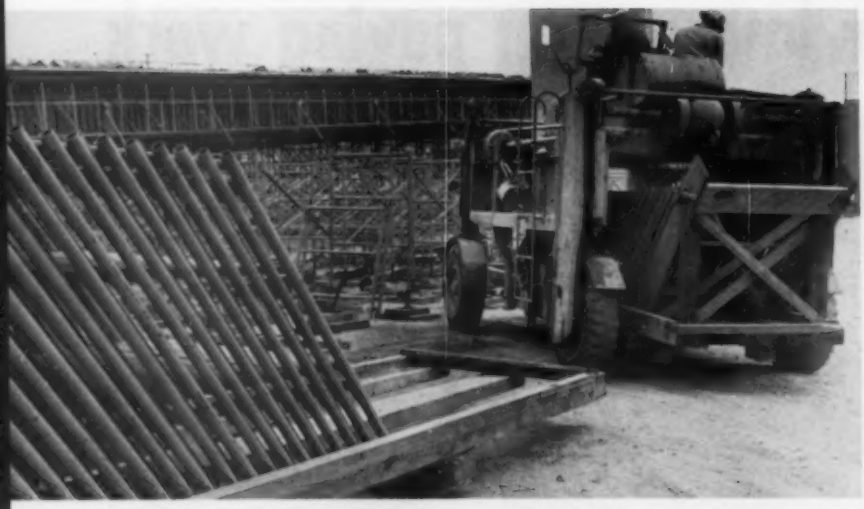
Second operator controls both the Jaeger Tandem Screed Finisher (with diagonal rear screed if pitched slab is being laid) and the Jaeger Finisher-Float which is towed and operated from the Finisher. Finisher-Float carries the fourth screed, plus 30″ transverse float pan for final kiss-finish. Screed and pan are suspended; bogey axles provide 4-to-1 correction. Final surface, as seen in unretouched photo, is ready for burlap—the smoothest pavement being laid today.

Machine is detachable from Finisher in 2 minutes. Screed and float pan are new "universal" type quick-crown-change to adjust to any specified crown. (Patent pending.)

2-MAN AIRPORT TEAM PLACES 3572 CU. YDS. A DAY OF CONCRETE STIFF ENOUGH TO WALK ON

12,250′ of 300′ wide runway (408,333 sq. yds.) is a 4-paver job if you want to average 3572 cu. yds. a day. But spreading and striking-off with a Jaeger Screw Spreader equipped for deep vibration, and accurate finishing with a Jaeger all-hydraulic Type JH Finisher, is a 2-operator job with capacity to spare.

Pavement was laid in 25′ increments of 19″, 21″ and 23″ depth. Best day's run was 2525′ (4091 cu. yds.). Note texture of laid material ahead of the 20′-26′ self-widening Finisher.



Holding as many as 35 frames each, these racks speed both erection and stripping, keep job congestion at a minimum.

TUBULAR SCAFFOLDING

Continued from page 77

terial easily enough to prevent loss through damage."

The 5′ x 6′ pulpit has a heavy plywood floor mounted on a steel framework. The whole unit mounts on the end of the boom, where a steel pin passes through lugs on the underside of the platform, and through a shaft-way at the end of the boom. Two steel pads on the boom's pulley housing prevent the hinged pulpit from swinging over backwards when the boom is raised to near-vertical position. The Austin-Western's wire line connected to an upright at the rear of the pulpit, is used to keep the pulpit in a level position while working.

"One of the biggest problems everyone faces on this job is lack of travel and working space," notes Larry Fischer. "We've eased congestion problems by using these racks—having the carrier move them out as fast as we load them with frames. The loaded racks can be left in the materials yard or hauled to the location of another structure. No matter how long they sit, they're not tying up expensive equipment."

Roadside Maintenance

Weed and Brush Spraying Precautions

To maintenance crews using chemicals to fight weeds and brush, here is a check list of precautions—from "Instructions and Precautions for Weed Spray Crew," by W. J. Garmhausen, chief landscape architect, of the Ohio state highway department:

1. Use competent planning and field supervision by informed and alert personnel.

2. Keep nozzles and spray guns pointed down when discharging spray mixture. Never direct spray outside the right of way limits.

3. Keep spray nozzles and valves clean and in good working order at all times.

4. Do not operate sprayer at a pressure higher than is necessary to get coverage, or at such a high pressure as will cause misting or fog of spray.

5. Do not spray when there is more than a gentle breeze (7 to 10 mph), or in other words when the breeze is strong enough to blow paper, debris and dust about, or when there is more than a gentle movement of the leaves and small twigs of trees.

6. Do not spray within the limits of any village, town or city.

7. Do not spray during the rain. Usually an application made one hour before a rain is sufficient time for the material to enter a plant's system.

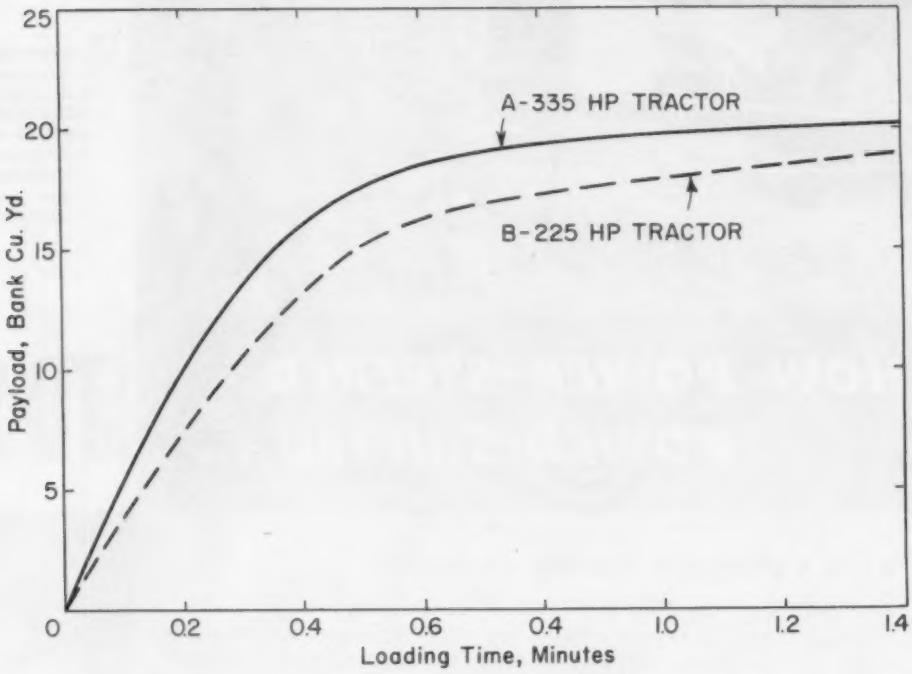
8. *Do not spray the right of way on either side of the road bordering:* (a) homes, (b) vegetable gardens - vegetable crops, (c) tobacco, (d) tomatoes, (e) sugar beets, (f) grapes.

9. *Do not spray the roadside next to:* (a) soybeans, (b) orchards (the opposite side can be sprayed in these cases if the breeze is not blowing toward the soybeans or orchard).

10. The roadside next to fields of legumes (clover and alfalfa) can be sprayed with the off center berm nozzle but not with the hand gun.

11. The roadsides next to fields of corn, wheat, oats and all grains can be sprayed but do not direct the spray into the fields.

12. Do not spray trees or shrubs on the right of way which have been planted or which have well placed existing trees or seedlings of volunteer growth. Do not spray the roadsides of those sections which have been seeded as part of new construction during the past year. Those areas which have been planted under tree planting programs of the past several years should not be sprayed.



PUSH TRACTOR

Continued from page 47

desirable for a contractor to know what volume constitutes the most economical load for a given project. Tables 2 and 3 illustrate a method of determining the loading times that will give the maximum scraper production for this particular project. These results will not necessarily be true for another project, especially if the job conditions vary considerably.

While the information given in Tables 2 and 3 will determine the maximum scraper production, this production may not give the lowest possible *cost* of loading, hauling and placing the earth. It may be that a reduction in the loading time from that indicated for maximum scraper production will release the push tractor soon enough to permit the addition of another scraper to the spread. If this can be done,

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Table 1

Total Cost and Hourly Cost of Equipment Including Operator's Wages

Equipment	Cost per unit	Cost per hour
Tractor and scraper	$56,250	$16.80
Tractor and dozer	14,180	8.50
Tractor and roller	17,120	11.20
Tractor and disc	15,100	10.80
Motor grader	18,600	7.00
Push tractor:		
335-hp. unit	57,240	17.80
225-hp. unit	41,600	13.50

Table 2

Maximum Scraper Production with 335-HP Push Tractor

Scraper cycle time, min.			Trips	Payload,	Production,
Loading	Other	Total	per hr.	cu. yd.	cu. yd. per hr.
0.5	5.1	5.6	8.93	17.6	158
0.6	5.1	5.7	8.88	18.5	164
0.7	5.1	5.8	8.63	19.1	165
0.8	5.1	5.9	8.48	19.4	164
0.9	5.1	6.0	8.33	19.7	163
1.0	5.1	6.1	8.20	19.8	162
1.1	5.1	6.2	8.07	19.9	160
1.2	5.1	6.3	7.94	20.0	159
1.3	5.1	6.4	7.82	20.1	157
1.4	5.1	6.5	7.69	20.3	155

Even moving a blade-full of shot-rock around the curve, there's no hesitation, no sluing to spill the load. The TD-25's operator has separate speed control of each track to get full-capacity performance, full time. And only the new TD-25 has the power plus of the direct-start, turbocharged DT-817 International engine—that delivers 230 high-torque hp!

HOW POWER-STEERED, POWER-SHIFTED . . . TD-25 takes

—on California mining operation

Even before all the blast dust has settled, this International TD-25 is slamming tons of shot-rock from the benches, so trucks can resume hauling to the processing plant. Then, at this gypsum mine in California, the "25" takes over the "shovel-feeding" chore—dozing full blades of rock upgrade, downgrade, and 'round the curves, to help keep the big dippers swinging full. And in between times, the "25" takes over its third tough project: benching new haul road around mountain slopes!

Three slam-bang rock operations to handle—it's a made-to-order situation for the Planet Power-steered TD-25!

"Dead-track drag" eliminated! You don't brake a track and "half-kill" your pull-power to turn, as you do with king-sized clutch-steered crawlers. With Planet Power-steering you simply change the speed of one TD-25 track—on-the-go, and with 2-finger ease! Around comes the fully-loaded TD-25—with "live" power on both tracks and both tracks pulling. Load-limiting "dead-track drag" is eliminated!

And combined, on-the-go Hi-Lo power-shifting lets you match power to load, instantly—forward or reverse. Just shift one track to high range—the other to low—to do slope-hugging, full-bite benching, or to operate straight ahead with off-center loads!

The "25" is platformed on new 7-roller tracks with double-box-beam frames. The design provides super undercarriage strength for slam-bang conditions—strength to match the full effort of the direct-start, high-torque DT-817 International Diesel engine.

Power-steer and power-shift the TD-25 with king-sized loads. Measure the bonus capacity you get with exclusive Planet Power-steering and Hi-Lo power-shifting. See how this control combination enables you to outearn other big rigs up to 50%. Then measure what it means to get this double-barreled advantage *only* in the TD-25—and as standard equipment *to boot!* Let your International Construction Equipment Distributor demonstrate.

International Harvester Co.
180 North Michigan Ave.
Chicago 1, Illinois
A COMPLETE POWER PACKAGE

International® Construction Equipment

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"Boulder-dozing" after blasting— The TD-25 does some "blasting" itself to move "big-as-a-house" hunks of rock aside. Heavy-duty TD-25 Dura-Rollers defy the rock-dozing "grind"—with the industry's thickest shells to prevent flexing—positive grit exclusion—and 1,000-hr.-interval lube capacity!

Here's your 76-page cost and production estimating book—newest, most authentic and complete guide for estimating material-moving costs—and for selecting equipment combinations for top profits, *anywhere!* See your International Construction Equipment Distributor!

over three slam-bang rock jobs

Table 3

Maximum Scraper Production with 225-HP Push Tractor

Scraper cycle time, min.			Trips	Payload,	Production,
Loading	Other	Total	per hr.	cu. yd.	cu. yd. per hr.
0.5	5.1	5.6	8.93	15.2	136
0.6	5.1	5.7	8.88	15.9	140
0.7	5.1	5.8	8.63	16.6	143
0.8	5.1	5.9	8.48	17.2	146
0.9	5.1	6.0	8.33	17.7	147
1.0	5.1	6.1	8.20	18.1	148
1.1	5.1	6.2	8.07	18.4	148
1.2	5.1	6.3	7.94	18.6	147
1.3	5.1	6.4	7.82	18.7	146
1.4	5.1	6.5	7.69	18.8	144

PUSH TRACTOR

Continued from page 81

the income from the gain in production of the spread may exceed the cost of the additional scraper. Certainly this possibility should be investigated.

Tables 2 and 3 are based on a 50-minute hour. All volumes are reduced to bank cubic yards by sample weighing the loads.

Table 4 shows the effect of using the same scrapers, but different size push tractors.

Table 5 gives the cost per hour for a spread using the 335-hp. and the 225-hp. push tractors.

Table 6 gives the cost per cubic yard and the total cost of handling 660,000 cu. yd. of earth, based on using the 335-hp. and the 225-hp. push tractors.

Since the equipment used on the two spreads is the same with the exception of the push tractors, the additional investment required by using the larger tractor is $57,240 − $41,600 = $15,640. The reduction in the cost of moving the earth by using the larger push tractor will be $0.016 per cu. yd., or a total of $10,560 for the job. If this same reduction in cost per cubic yard will also apply to the next job on which the equipment will be used, it will require a total of 15,640 ÷ 0.016 = 978,000 cu. yd. to recover the additional investment in the larger push tractor. For a production of 495 cu. yd. per hour it will require 978,000 ÷ 495 = 1,975 hr. to recover the additional investment. After the elapse of this period of time the reduction in cost will represent additional money accruing to the contractor.

Based on a production of 495 cu. yd. per hr. the hourly saving in the cost of moving the earth by using the larger push tractor will be 495 × $0.016 = $7.92. If this tractor will have an economical life of 10,000 hr., it will be operated 10,000 − 1,975 = 8,025 hr. after the additional investment is recovered. At an hourly saving of $7.92 the total saving during its use will be 8,025 × $7.92 = $63,500, disregarding any possible higher trade-in or salvage value than the smaller tractor when it is disposed of.

The foregoing analysis illustrates that it is possible to reduce your costs and increase your profits by intelligent selection and use of equipment.

Table 4

Production vs. Push Tractor Size

Item	Push tractor 355-hp.	225-hp.
Economical loading time, min.	0.7	1.0
Scraper cycle time, min.	5.8	6.1
Trips per hr.	8.63	8.20
Payload, bank cu. yd.	19.1	18.1
Production per scraper, cu. yd. per hr.	165	148
Production of spread, cu. yd. per hr.	495	444
Increase in production, cu. yd. per hr.	51	0
Increase in production as a percent	11.5	0

Table 5

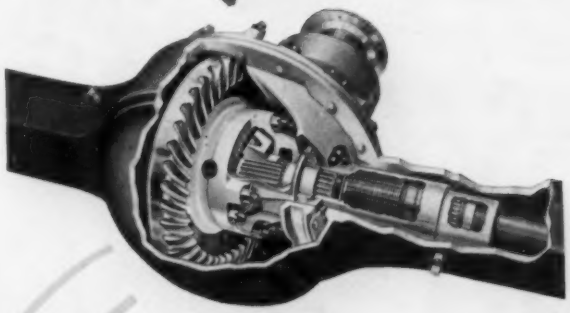
Cost per Hour for Each Spread

Equipment	Cost per hour 335-hp. tractor	225-hp. tractor
3 Scraper units	$ 50.40	$ 50.40
1 Push tractor	17.80	13.50
1 Tractor and dozer	8.50	8.50
1 Tractor and roller	11.20	11.20
1 Tractor and disc	10.80	10.80
1 Motor grader	7.00	7.00
Total	$105.70	$101.40

Table 6

Cost per Cubic Yard and Total Job Cost

Item	Push tractor 335-hp.	225-hp.
Cost of spread per hr.	$105.70	$101.40
Production, cu. yd. per hr.	495	444
Cost per cu. yd.	$0.213	$0.229
Reduction in cost per cu. yd.	$0.016	0
Cost for 660,000 cu. yd.	$140,580	$151,140
Reduction in total cost	$10,560	0



Rockwell-Standard® Traction Equalizer... puts action where there's traction!

The Rockwell-Standard Traction Equalizer provides a substantial increase in tractive effort to the wheel with the best road adhesion. It is effective on a vehicle even if one pair of driving wheels has no traction. Provides safer, surer performance on or off the highway . . . easier control on curves, slippery pavement and soft ground. Eliminates tendency of vehicle to swerve when one wheel suddenly loses traction.

Automatic actuation. Doesn't depend on driver to start it working. Whenever one wheel tends to turn faster than the other, Traction Equalizer starts to work.

Tailored to your needs. With multi-drive axle vehicles, each axle may be equipped with Traction Equalizer units. No matter where your vehicles operate—on or off the highway—the Rockwell-Standard Traction Equalizer gives your vehicles better traction.

Self lubricating. Traction Equalizer automatically picks up standard axle lubricant and works it through unit.

Less maintenance. Normally, Traction Equalizer requires no maintenance between axle overhaul periods. It also cushions impact of heavy loads on tires, shafts and gears.

Another Product of... **ROCKWELL-STANDARD CORPORATION**

Transmission and Axle Division, Detroit 32, Michigan

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SAM FINLEY, INC., of Atlanta, Georgia, uses the Huber-Warco maintainer to prepare base on many of smaller paving projects. They like the maintainer's versatility and ability to work in close quarters. The Huber-Warco 8-10 tandem roller compacted the hot-mixed asphalt used on this parking lot. The company uses 15 Huber-Warco machines in diversified paving work.

HUBER W WARCO

HUBER-WARCO *maintainers*

"Nine Machines In One"

VERSATILITY and year 'round performance are two important benefits of a Huber-Warco Maintainer. The basic machine has a nine-foot power sliding moldboard for routine grading work. Hydraulic controlled attachments quickly convert the Maintainer for service as Bulldozer, Lift-Loader, Scarifier, Berm Leveler, Side Dozer, Broom, Patch Roller and Snow Plow.

TORQUE CONVERTER combined with 45½ H.P. gasoline engine gives plenty of power for toughest jobs. Converter reduces shock loads, prolongs machine life, increases work capacity and cuts fuel consumption.

WORKING SPEEDS range from 1.7 to 8 M.P.H. Travel speed is 21 M.P.H. for quick movement between jobs. Weight is 6,250 lbs.—7,205 lbs. with calcium chloride in tires.
A complete line of optional equipment, in addition to the hydraulic attachments, is available for the Maintainer.

A trusted product name backed by respected distributor names from coast to coast

MOTOR GRADERS

Standard transmission models from 83 to 160 H.P. Torque converter and power shift transmission models from 102 to 195 H.P.

TANDEM ROLLERS

3-5 Ton • 4-6 Ton Retractable • 5-8 Ton • 8-10 Ton • 8-12 Ton • 10-14 Ton

3-WHEEL ROLLERS

10-Ton • 12-Ton • 14-Ton Standard Weight 10-12 Ton • 12-14 Ton Variable Weight

MAINTAINER

M-52 — 45½ H.P. Attachments are Lift-Loader, Broom, Bulldozer, Patch Roller, Scarifier, Snow Plow, Berm Leveler

HUBER-WARCO COMPANY **Marion, Ohio, U.S.A.**

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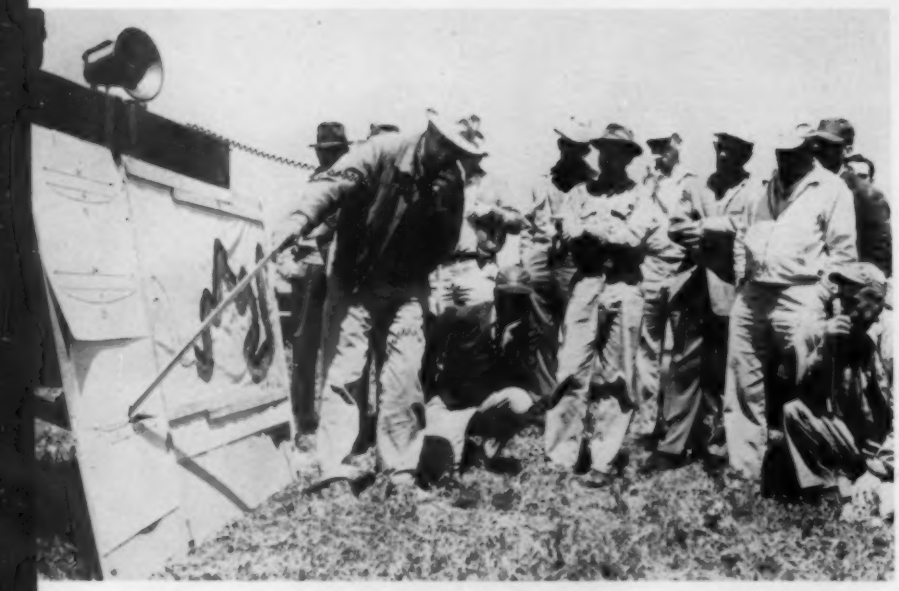
An Allis-Chalmers TS-160 motor scraper forming a waterway in the cut-and-fill terracing system demonstrated. A Model 45 motor grader grades a diversion terrace.

Farm Terracing: Spare Time Work for Road Builders

Contractor job opportunities in conservation earthmoving, as well as benefits of modern terrace systems, were explained to contractors and farmers recently at a cut-and-fill terracing demonstration near Springfield, Illinois. The show was sponsored by Sangamon County's Soil Conservation District in cooperation with Illinois Road Equipment Co., local Allis-Chalmers construction machinery dealer.

The demonstration was centered principally in the building of a division terrace about a mile in length. But it also revealed the earthmoving method recommended for parallel terrace systems—a type of improvement adding up to a major contractor market.

Some of the farmers present at



Otto Baumann, Soil Conservation Service engineer, explains cut-and-fill terracing techniques to farmers and contractors on a central Illinois farm.

the demonstration had doubts when they saw the huge scrapers digging in and uncovering subsoil. Many of the local people hadn't as yet made use even of conventional contouring methods. These on-lookers were concerned that much usable soil is wasted or washed away during sudden rainstorms in connection with terracing. Most felt, however, that the same treatment could be extended to their own lands.

Contractors present, for their part, were shown a wide-open source of jobs for their equipment in spare time. The individual contractor however would need to do some missionary work.

For example, farmer Fred Tomlin was convinced that this method was no gamble. Demonstrations in the past have shown that applications of fertilizer and manure on exposed subsoil will render the soil fertile in a relatively short period of time. Guy Fuller, soil conservation service agronomist from Macomb, Illinois, reported that within two or three growing seasons, the exposed area would again be a good corn producer.

Tomlin estimates in an argument for high-power machinery terracing that only about 5 percent of the total excavated area was seriously affected, and as far as the resultant compaction problem was concerned, good tillage combined with next winter's frost would bring the soil density back to normal.

Other selling points of the cut-and-fill method of terracing were brought to light for the farmers and contractors by A. P. Crowell, SCS work unit conservationist, and Otto Baumann, SCS area engineer. Using charts for the 106-acre field being worked on, they pointed out that through cut-and-fill techniques, parallel terraces can be installed which will farm easier with four and six-row equipment.

A mile of division terrace was built on Tomlin's farm requiring about 2,000 to 2,500 cu. yd. of earthmoving. Left to be done later was some terracing parallel to the diversion or key-line terraces. These will be spaced at 108 ft. intervals. Land slope in the field averages 5 to 6 percent. The 10-ft. wide terrace channel was graded to .4 ft. per 100 lin. ft., with seven grassed waterways to disperse runoff.

Engineering Firm Automates Contour Mapping

Contour mapping, essential for laying out new highway routes and many other purposes, can now be almost completely mechanized, or so it is believed by Lockwood, Kessler & Bartlett, eastern consulting engineering firm.

A digitizer, specially built for this company by AIL Division of Cutler-Hammer, Inc., is saving man-hours of skilled work and reducing the need for mapping in some special fields, according to Ford Bartlett, the consulting firm's president. This group underwrote about a third of the $45,000 of development costs that went into the new machine.

The equipment works from aerial photographs in conjunction with a Wild stereoplotter. It records coordinates from the photos on paper, in light signals and on punched paper tape. The unit requires one operator in place of three formerly needed. The punched tape eliminates further work in preparing data that can be used in a computer to process the results required. Terrain data processed in this way is considered a low-cost substitute for weeks or months of field survey by ground engineering crews.

Showing the first corner excavation along the footing, with a submersible pump sitting in a perforated barrel—see text for details.

Submersible Pumps Keep Footing Area Dry

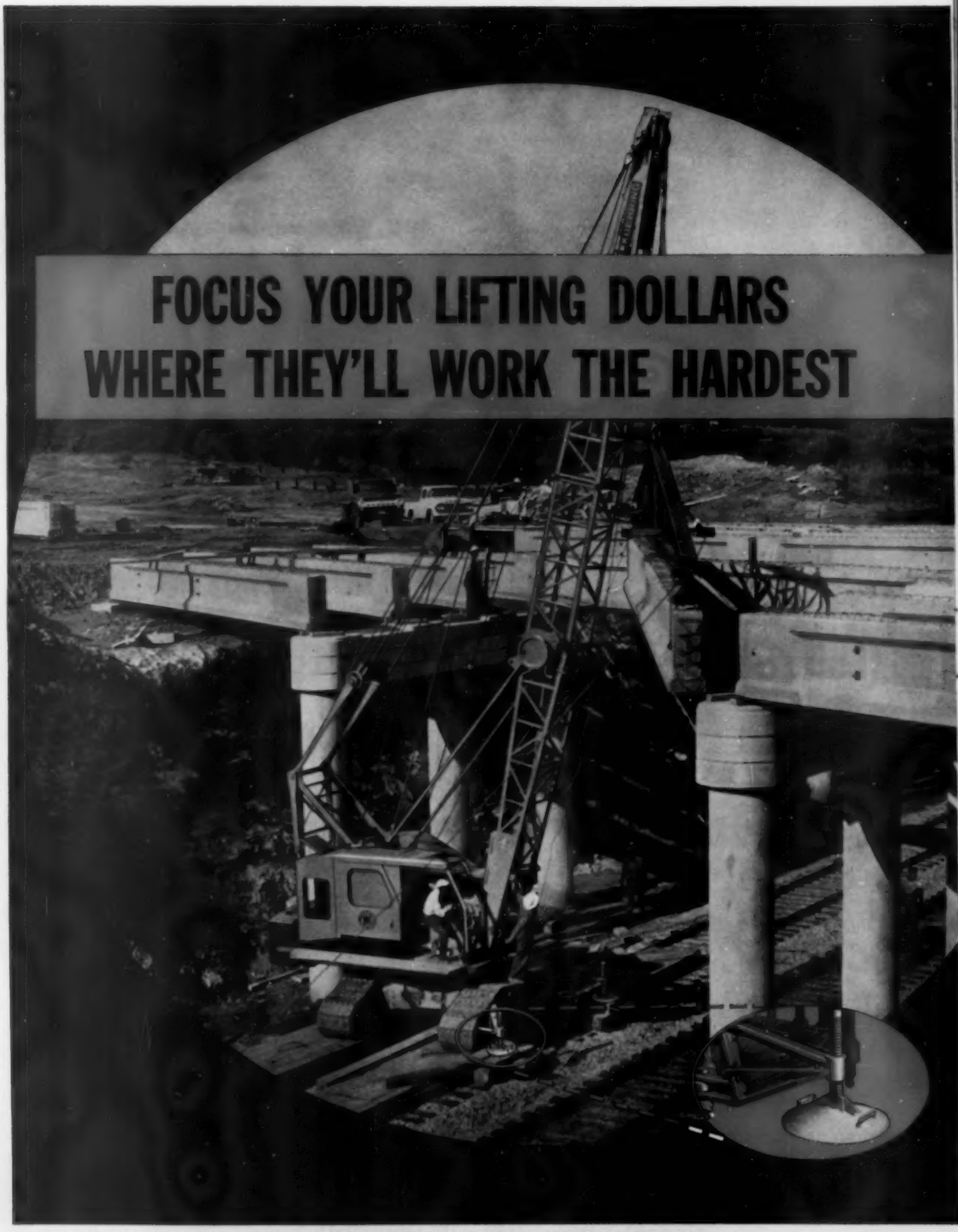
An example of how electric submersible pumps can do a ground-water lowering job in place of more elaborate well-point equipment, is pictured here. The job is a structure foundation at Toronto, Canada. Surface water from rains was a site problem along with a high water table. Sandy soil made dewatering particularly urgent to avoid cave-ins of the footing excavation.

The solution by Ruliff Construction Company, the contractors, was to install five electric submersible pumps (Flygt). Four were 3-in. and 1 was a 1½-in. unit.

A hole 15 ft. deep was dug to bottom-of-footing elevation at a structure corner. At 6 and 12 ft. depths as digging progressed, excavation was interrupted and a 3-in. pump placed at the bottom, inside an empty perforated barrel.

After several days of pumping, the water table was low enough for the structure excavation to proceed, and pumps were similarly installed at the other foundation corners.

Since this foundation was of rather sizeable dimensions, weeping tile was installed to catch seepage and prevent it from building up under the construction area. Occasionally one of the smaller submersible pumps was used in the center area as a "mop".



KOEHRING 545 SPRAWLER, owned by James T. Triplett Inc. of Chester, S. C., eases heavy precast bridge member into place. Machine has pivoting outriggers (see inset) that enables it to outlift its own working weight by 14%. Maximum lifting capacity with outriggers set: 90,000-lbs.

Look to Koehring

Look over the big Koehring lineup of heavy-duty lifting cranes: crawler, Sprawler, truck and Cruiser models. They're heavy duty through and through, built to outlast and outlift other makes for years and years. Here's why . . .

BUSINESS END gives the operator plenty to work with: automatic power boom lowering, power load lowering, pendant boom suspension, boom limit stops, pin-pad boom connection. Makes for faster, safer load lifting and spotting . . . quicker, easier setups.

MAIN MACHINERY delivers smooth, direct power flow. Shafts are driven by cut steel gears, rotate freely on anti-friction bearings. Side stands are line bored in place to keep shafts in perfect alignment.

A MOUNTING FOR EVERY NEED. Self-cleaning, heavy-duty crawlers and rugged truck and cruiser models to meet job requirements . . . deliver maximum load stability with minimum maintenance.

SEVEN CRAWLER MODELS
FROM 10 to 95-TON CAPACITIES

TWO SPRAWLERS
30 and 45-TON CAPACITIES

FIVE TRUCK MODELS
FROM 18 to 55-TON CAPACITIES

TWO CRUISER CRANES
18 and 25-TON CAPACITIES

See your Koehring distributor . . . or write for a bulletin on the crane of your choice.

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MORE WORK CAPACITY . . . MORE PROFIT PER DOLLAR INVESTED

Ask your distributor about the 1960 KOEHRING EQUIPMENT SHOW—Waukesha, Wis., Week of Sept. 19th.

Milwaukee Bridge Company's Koehring 305 Truck Crane hoists steel girder for bridge deck. The 305 has a maximum lifting capacity of 25-Tons.

Koehring 605 . . . 36-Ton Crawler . . . pours concrete on Texas Dam project.

Koehring 445 Truck Crane...45-Ton capacity... speeds overpass work on highway job. Ramsour Bros., Castle Rock, Colorado is the contractor.

K28
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Busiest Plant in the Business

keeps concrete-hungry pavers on the go . . .

Working high-production pavers? Keep 'em in mix with a Johnson Automaster-C. This highly portable cement batch plant moves in and sets up fast. And you can relocate it in short order to keep ahead of paving work. All parts of the plant package are pre-assembled into compact, easy traveling packages. Simple plug-in connections eliminate complex field wiring hookups.

. . . moves up to 360 batches per hour

Automaster-C has 1560 cu. ft. of overhead cement storage. Auxiliary ground silos are available in a wide range of capacities. Take you choice of one or two 14 cu. ft. cement batchers. Single batcher weighs out up to 180 batches per hour . . . dual batchers up to 360. Batch size: 1½ cu. yds. for each batcher.

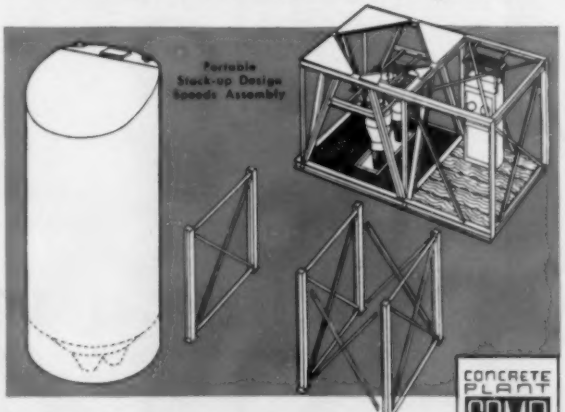
. . . be prepared to bid on any job

To meet U.S. Engineer specifications, batching equipment can be furnished with dial scales, 12-mix selector system, graphic pen recording, time and date stamp, interlocks, and aggregate moisture compensating beams. Ask your Johnson distributor for details.

J6

JOHNSON Automaster-C

Portable cement batch plant



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COMPARE BUFFALO-SPRINGFIELD 3-WHEEL ROLLER WITH ANY OTHER

TAKE a good look into the Buffalo-Springfield 3-wheel roller . . . compare it with other makes on the market. You'll find solid reasons why the Buffalo-Springfield 3-wheel has long been a favorite among contractors. Here are just a few advantages: each drive roll has heavy-duty, double-shoe type, self-energizing power brakes. *All* rolls run on tapered roller bearings. Field-proved 4-speed transmission delivers a full range of road speeds at full power. All internal parts operate in oil bath. Bevel gear differential provides smoother operation around curves.

When the 3-wheel does need adjustments — and this doesn't happen too often — they can be made in minutes. Large inspection covers give quick access to all working parts. You don't have to dismantle one part of the machine to get at service points . . . save time. Clutches are well forward of drive rolls and protected against dirt and grit by metal shrouds. Both are readily accessible at at all times.

For the full story on the quality Buffalo-Springfield 3-wheel roller, and facts on how it can save you money over the long haul, see your Buffalo-Springfield distributor. Variable weight 10-14-ton and 12-15-ton models available. B6

See your distributor about the Koehring Equipment Show . . . Waukesha, Wisconsin . . . Week of Sept. 19th

BUFFALO-SPRINGFIELD CO.
Springfield, Ohio

A Division of KOEHRING Company

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Plant and pit for sand production, seen from top of stockpile. Gravel road on right led to project.

Two-Man Plant Produces 25,000 Tons Concrete Sand

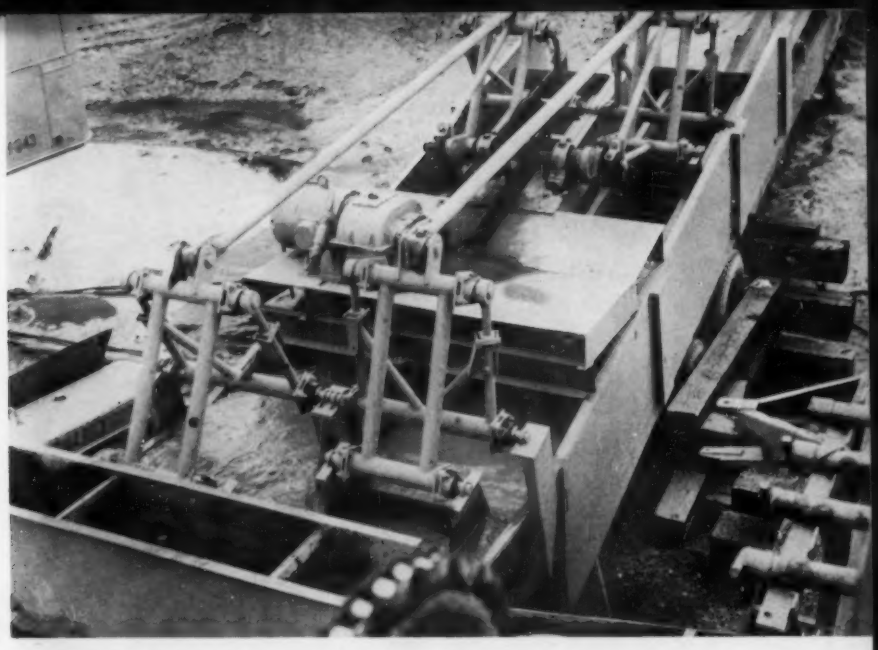
Only two men—a bulldozer operator and a plant mechanic—were needed to screen, wash and stockpile 25,000 tons of fine aggregate for a 5.3-dual-mile concrete paving project in South Dakota. The job is that of Western Contracting Corporation, Sioux City, Iowa, for a segment of I-90 near Sioux Falls, S.D. The aggregate is being produced on a subcontract by Everist Inc., Sioux Falls, S.D.

W. A. Arns, assistant district engineer for the state, considered this to be a rather remarkable accomplishment, in view of the usual difficulties which contractors encounter locally in meeting gradation requirements. Gradation tests ran "right down the middle."

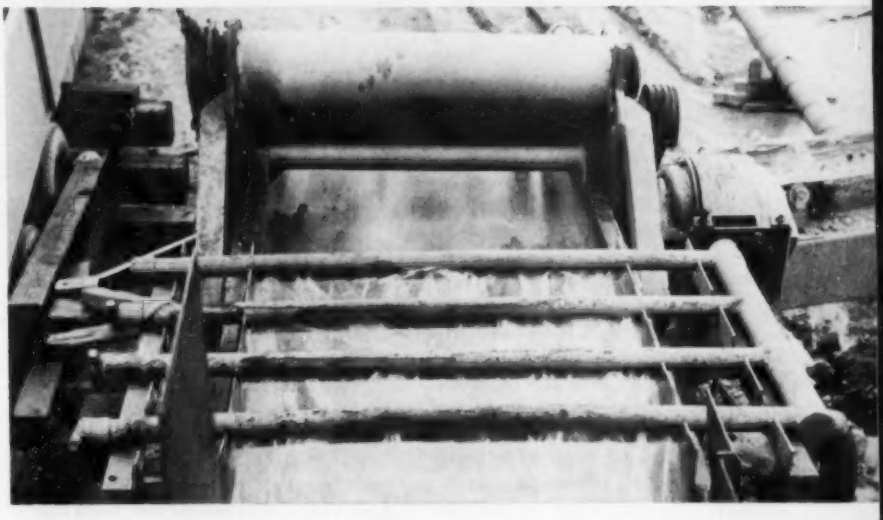
The accompanying photographs show how the contractor worked in a heavy-overburdened glacial pit to wash and classify the aggregate. The pit, 3 miles from the project, was located in rolling farm land, adjacent to a good gravel road, and about 500 ft. from a small creek. The gravel road insured all-weather hauling; the creek provided ample washing water.

A Cat D8 dozer handled the strippling of from 3 to 6 ft. overburden. The plan for stripping was first to doze the overburden so as to expose an area of the 7-ft. thick gravel deposit. The dozer then pushed this gravel into the hopper. When the first area was worked out, most of the original overburden was dozed back into the worked-out area. This allowed a new strip of gravel to be exposed without the dozer having to handle an accumulation of overburden.

The plant consisted of three Kolman conveyor units, a vibratory washing screen and a classifier. All units were mounted on wheels. The conveyors included a 48 in. Kolman primary belt from hopper



Mobile classifier, built in contractor's shop.



Kolman 48-in. conveyor fed 3/8-in. washing screen. Water supply line and conveyor to waste stockpile seen at right. Conveyor to classifier is on left.

to washing screen; a 30 in. belt to fine aggregate stockpile; and a 24 in. belt to waste stockpile. While the washing screen had two decks, the contractor used only the 3/8 screen. The rake classifier was fabricated by Everist Inc., in the company's shops and to the company's own specifications.

Semi-trailers were used to mount the screen and classifier.

A van type trailer housed a Cat 13000 diesel generator as a power supply for this completely electrified assembly. Another trailer housed spare parts and repair equipment.

Washing water was pumped from from the creek by a trailer-mounted 10 x 8 in. centrifugal pump powered by a GMC diesel unit.

Concrete sand production was 90 to 100 tons per hour. The dozer fed the hopper as well as stripping overburden and shoving aggregate into the pile around the hopper. The dozer operator had time to handle the waste stockpile without interfering with hopper feeding.

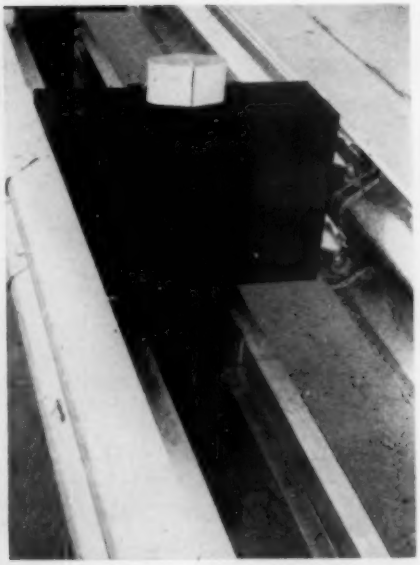
It was customary to let the hopper run dry occasionally to allow removal of any large boulders which might be trapped in the 8-in. grid above the feeder to the primary belt. The plant was shut down for periods of about 20 minutes twice a day for dozing aggregate into the main stockpile and to allow the mechanic to service the equipment. Some dozing was done at night.

The dozer operator, in commenting on the mobility of the outfit, said that all they needed were 5 trucks and 2 pickups to move the entire plant.

The required aggregate gradation was: passing 3/8 screen, 100%; No. 4, 95 to 100%; No. 16, 45 to 80%; No. 50, 10 to 30%; and No. 100 screen, 2 to 10%.

Careful use of surveyor's chain and offset for post locations paid off in fast installation of blocked-out beam barrier.

Required to be set accurately (within ¼-inch), beam barrier posts are being "eye-balled" for heighth prior to finish backfilling and hand tamping.



Completed—blocked-out beam barrier —showing two rails, blocking for upper rail and reflectors mounted atop post.

MEDIAN BARRIER CREW

Continued from page 50

Steel posts for the cable chain link fence were set 130 to 150 or more at a time to provide fullest use of a 5-yd. load of transit-mix concrete. Gry reports he was able to set about 22 posts per cubic yard of cement. Every 15th to 20th post was carefully set and the intervening posts were "eye-balled" for center and height.

Where posts were set on existing structures, such as overpasses, the median was excavated for a 24-in. wide reinforced concrete pad designed to extend the width and depth of the median strip. Posts were set while pouring this pad and the surface hand-troweled to the median profile.

After the posts were set, the ¾-in. cable was unwound from 500-ft. reels mounted on the rear of a flat-bed truck. As fast as cable lengths were made up into turnbuckles, a pickup truck with a specially built tension wire reel was driven down the closed lane, leaving a single strand of tension wire for the top of the fence. The tension wire was tied to the tops of the posts, then fabric was unrolled and hung. Lastly, the ¾-in. cables were placed on the fence and secured there with U-bolts.

Blocked-Out Beam Barrier

The 30,000 ft. of single and double beam barrier, used where the median is less than 12 ft. wide, consists of creosoted 8″ x 8″ Douglas fir posts set 41 in. deep. The top of this barrier is 31 in. above the median.

Two steel rails running from post make up the collision barrier. The lower rail is a 6″ x 8.2-lb. channel; the upper beam, M-section corrugated steel guard railing. Where the 6-in. channel is bolted toe-in on the creosoted posts, the larger corrugated railing is blocked out from the posts by 8″ x 8″ fir blocks, a ¾-in. bolt tying the rails, blocks and posts together.

While post placement was not the bottleneck in constructing the cable chain link sections, this operation was the pace setter on freeway sections utilizing the blocked-out beam barrier. The posts and rails were all pre-drilled and provided a maximum leeway on only ¼ in. per post.

It was quickly determined that the template system could not provide the accuracy demanded here. Gry had yellow bands accurately painted on his surveyor's tape for the 6′3″ post centers. A wooden offset was made and Gry's crew began spotting post locations.

After stretching the tape taut along the exact center of the strip, the men, using a carpenter's square and yellow keel, marked first for the center of the hole, then squared off to the curb and drew a line the length of the long leg of the square. At both the 12-in. and 2-ft. points, a cross line was marked. Great care was taken during this process to make certain the chain did not move and that all marks were made accurately and distinctly.

As in the case of the chain link fencing, disks were cut neatly from the black top and the post holes drilled. Closely following the auger was a crew with the wooden offset, a plumb bob and hand post hole diggers. The offset was placed along the teal mark, cross lines on the offset and the asphalt were matched up, and the bob lowered from the four points of the offset to check.

Posts were lowered into the 41-in. deep holes and lightly backfilled. Care was taken to assure that the post was centered with respect to the marks on the black top. Posts were "topped" by eye as in the case of the steel posts earlier, and backfilling with original soil completed to within 2 in. of the surface and tamped. Asphalt was then placed

Continued on page 101

OLIVER OC-12 tops in its class with more power per pound

...prove it with an on-your-job work test!

The roughest, toughest, dirtiest job you have is a snap for the OC-12! Here's almost 13,000 pounds of drawbar pull in a modern, live-weight crawler that's geared for action.

The OC-12 has heft only where needed. It packs in its high-clearance design the solid dependability that keeps it on the job year after year.

High-speed maneuverability with low-effort operation is yours, too. Oliver's exclusive "Spot-Turn" wet clutch steering lets you brake and turn with only one lever for each track. You move faster, easier, safer in the crawler that users say is the production champ its size.

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New PR123 GARDNER-DENVER Power Rotation Rock Drill

ABSOLUTE CONTROL

New Gardner-Denver PR123 gives your operator absolute and independent control of all these vital functions:

ROTATION WITHOUT IMPACT —efficient gear motor supplies rotation in either direction, even when drill is not impacting. Three rotational speeds.

IMPACT WITHOUT ROTATION —separate control provides drill impact without rotation. Percussion can be varied from light to heavy blows, and used to loosen couplings or stuck steel.

IMPACT AND ROTATION —use light percussion and rapid rotation for soft formations . . . or heavy impact and slow rotation for drilling hard rock.

UP TO 30% FASTER PENETRATION

New PR123 uses all hammer energy for percussion. There's no rotational drag on piston hammer. Results: faster hard-rock drilling than ever before. Depth of hole does not affect drilling speed.

SELECTIVE DRILLING

Now your driller can select the right combination of rotation speed, impact force, feed pressure and hole blowing for fastest penetration in any type of rock—can change drilling action as soon as the bit hits a new formation.

NO ROTATION PARTS IN CYLINDER

New PR123 has no rifle bar, ratchet ring, pawls, or other internal rotation parts that frequently cause trouble. Rotation is supplied by an efficient gear motor, and a torsion bar absorbs rotational shock between shank and motor.

POWER COUPLING AND UNCOUPLING

Independent power rotation is a time-saver. Rotation without impact permits power coupling of threaded rod without thread damage. Reverse rotation speeds uncoupling when coming out of the hole. Independent power rotation also helps free stuck steel.

Specifications: Piston diameter: 4½". Length: 38½". Weight, less mounting: 290 pounds.

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Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario

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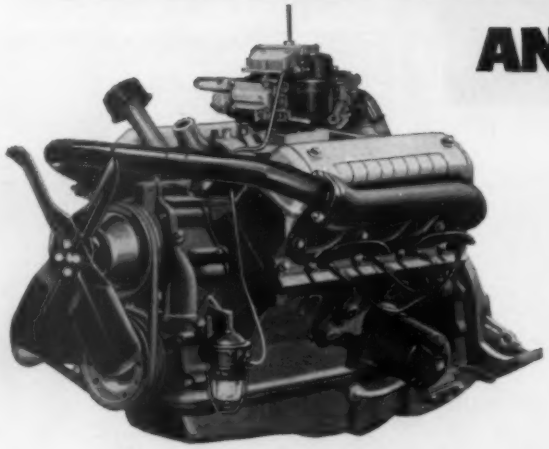
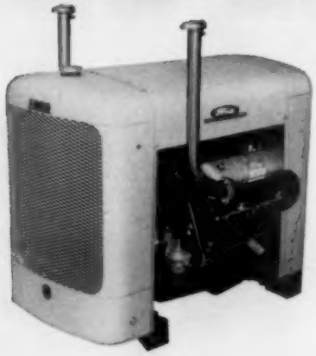
Announcing the rugged

FORD 292 V-8

INDUSTRIAL ENGINE

AND POWER UNIT!





For every power need . . . a complete line of Ford Engines, ranging from 134- to 534-cu. in. displacement!

New, but no rookie in dependable, proven performance . . . the 292 Heavy Duty V-8 is built with Ford's characteristic attention to *advanced engineering*—based on years of Industrial Engine know-how! And it's available as a new economical foot- or skid-mounted power unit.

The 292 V-8 combines long-lived dependability with peak performance. These are counterbalanced engines . . . rugged, yet compact . . . economical, yet powerful . . . advanced, yet proven!

Ford Industrial Engines offer features like *rigid Deep-Block construction* that cuts vibration to the bone . . . *Short Stroke Design* for fuel economy and more usable horsepower . . . *Full-Flow oil filter* that cleans *all* the oil . . . and *Free-Turn valves* for longer valve life and improved seating.

The summation: More horsepower per pound of engine weight than ever before possible! *All this* in a line of engines that range from 134 to 534 cubic inches, including three Super Heavy Duty V-8's and three economical Diesels. Most engines are available as engine assemblies or complete power units. Gasoline models can be adapted to LP-Gas or natural gas fuel.

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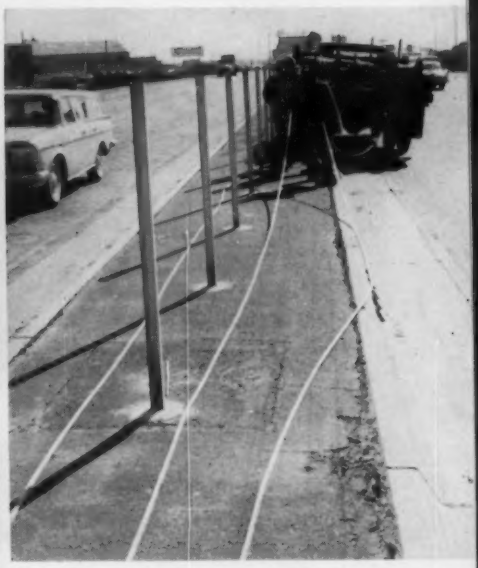
Driver faces rear, with all controls reversed on this Ford 601 with Danuser digger.



Steel cable for the barrier is being laid out from a 500-foot reel on the flat-bed truck.

MEDIAN BARRIER CREW

Continued from page 96

around the post and finished off.

Apart from traffic considerations, this setting of the wooden posts was the most ticklish part of the entire job. With so little leeway possible, there was virtually no chance of measurable error on post locations without moving the pre-drilled holes in the posts and rails out of alignment.

It took something like 65,000 bolts to make up the 31,000 lin. ft. of single and double blocked-out beam barrier. Most of these were used in making up the splices and laps of the lower channel and the upper corrugated railing. Other bolts were used in securing the channel and railing to the posts and blocks. All the bolts were tightened with electric impact wrenches, powered by a portable Borg-Warner Zeus generator that was rolled along the barrier in a wheelbarrow.

Initially, some concern was registered by highway officials and others over the holding capacity of the dirt backfill that was hand-tamped around the posts. This concern was put to rest when an out-of-control auto skidded into a row of the posts set in untamped fill dirt. Twelve of the 8″ x 8″ posts were sheared off cleanly. None were torn from the holes.

Fixed Plant? No. It's Highly Mobile

Over 36,000 cubic yards of concrete for construction of the New Jersey approaches to the George Washington Bridge, New York, is being supplied entirely by a Noble-Mobile central-mix batching plant on wheels. George M. Brewster & Son, Inc., is the general contractor.

Enclosed from the weather for three years of 'round the calendar operation, the plant was designed to produce up to 125 cu. yd. per hour of specification concrete. Up to 100 tons of aggregates are stored in three compartments, 275 bbl. of cement in a separate compartment with an additional 300 bbl. in a ground silo. A 5-yd. dry-batch holding hopper at the end of the batch transfer conveyor charges the tilting mixer.

The plant components while having the "enclosed look" of a permanent setup, consists of wheel-mounted units that can be moved and re-erected easily and quickly.

Highway research has become a complex, highly sophisticated operation. This bank of instruments are required to test the deflection and stress of bridge members. The instruments, taken to the bridge sites in a trailer-laboratory, record the information by measuring the electrical resistance of tiny wires attached to the structure at 48 different points, as vehicles move across it.

Highway Engineers Outline $34-million Research Program

Dwindling aggregate supply puts research for new and improved materials at top of list

The Highway Research Board last month recommended the launching of a $34-million highway research program, in an accelerated attempt to discover better ways of designing and building new roads and handling traffic.

The report—a comprehensive study in itself—represents the most intensive survey of highway research needs ever undertaken by the highway engineering profession. It is the result of two years of study by a committee headed by E. H. Holmes, assistant commissioner for research, U. S. Bureau of Public Roads.

The committee designated 19 broad areas in which research must be taken to deepen the limited body of knowledge now available. They include design, accident investigation, economics of highway transportation, translation of results of the AASHO road test, non-user highway benefits, electronic traffic control, and others.

$10 million for Aggregate Study. Topping the list – costwise – is a recommendation for research into the performance of aggregates of various characteristics in concrete and bituminous pavements. The engineers declared the improvement of knowledge in this area as "most urgent," and asked that $10 million be earmarked for this purpose.

They cited the accelerating demand for roadbuilding materials and the diminishing supply of aggregates of desired quality as justification for an accelerated effort here. It is possible that usable new aggregates can be produced by using nuclear energy to transform clays and other inferior materials. Also, strengthening of soils through chemical stabilization and development of better means of removing water was suggested.

Improvement of understanding of the physio-chemical properties of soils through new techniques in the laboratory, use of radio-active isotopes to trace movement of water in or under the surface structures, use of nuclear devices to measure soil density and moisture and to aid in controlling compaction of fills, offer much promise, the committee reported. There is continued need also for study of the desired degrees of compaction and best means for obtaining it for various soils.

In short, in one of the oldest fields of highway research, there is still a paramount need to discover more and better construction materials whose performance can be forecast with confidence.

"Translation" of AASHO Road Test Results. The second largest

Continued on page 104

Now "trade" dead weight for payload..and haul 40% faster!

Heap-load the big-target Payhauler body in minimum time. Strong rock-ribbed corrugations absorb shock —resist wear and distortion. Choose the "95" with power-shift Torque-Converter, or 9-speed air-shift transmission.

New strength-multiplying corrugated body design results in payload-gaining weight reduction of both International Payhauler models. New "95" capacity is increased to 27 tons—and the new "65" becomes the only 19-tonner on the market!

Look at those exclusive, rock-ribbed body corrugations! International applies this strength-multiplying principle to reduce Payhauler® body weight by an amazing 30%! You "trade" 2½ tons of power-wasting dead weight for 3 bonus tons of payload capacity in the new 95 Payhauler!

New high-torque, high-output diesel power highballs 27-ton payloads up to 40% faster than the former "95" could haul only 24 tons! The new 375 hp DT-817 International diesel engine gives the new 95 Payhauler the wallop of 40 extra turbocharged "horses."

Prove to yourself that top load-carrying capacity plus top power-to-weight ratio give 95 Payhaulers tremendous profit-earning advantages. Add up other big Payhauler exclusives: fast reverse, up to 7.1 mph. for spotting speed; big-target bodies for loading zip; 11-second inverted-hoist dumping; load speeding safety of torqmatic braking and positive power-steering! Let your International Construction Equipment Distributor demonstrate!

International® Construction Equipment

International Harvester Co., 180 N. Michigan Ave., Chicago 1

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers and Bottom-Dump Wagons... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

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$34,000,000 PROGRAM

Continued from page 102

expenditure is wanted for translating the results of the AASHO Road Test in Illinois to conditions in other states, the committee said. Completion of the big project this fall is expected to produce theories of design immediately transferable to other areas of soil and weather conditions differing not too greatly from those at the test site. Even so, other states must build experimental sections of their own to test the applicability of the AASHO test to their local conditions. The Committee recommended the construction of such sections as regular roads, subject to normal traffic.

Other major areas requiring a million dollars or more were:

Development of driving simulator $3.5 million

Electronic control of vehicles 3 million

Simulation of traffic flow 3 million

Intensive investigation of accidents 2 million

Comprehensive study of passenger transportation in metropolitan areas 1 million

Snow and ice removal or treatment 1 million

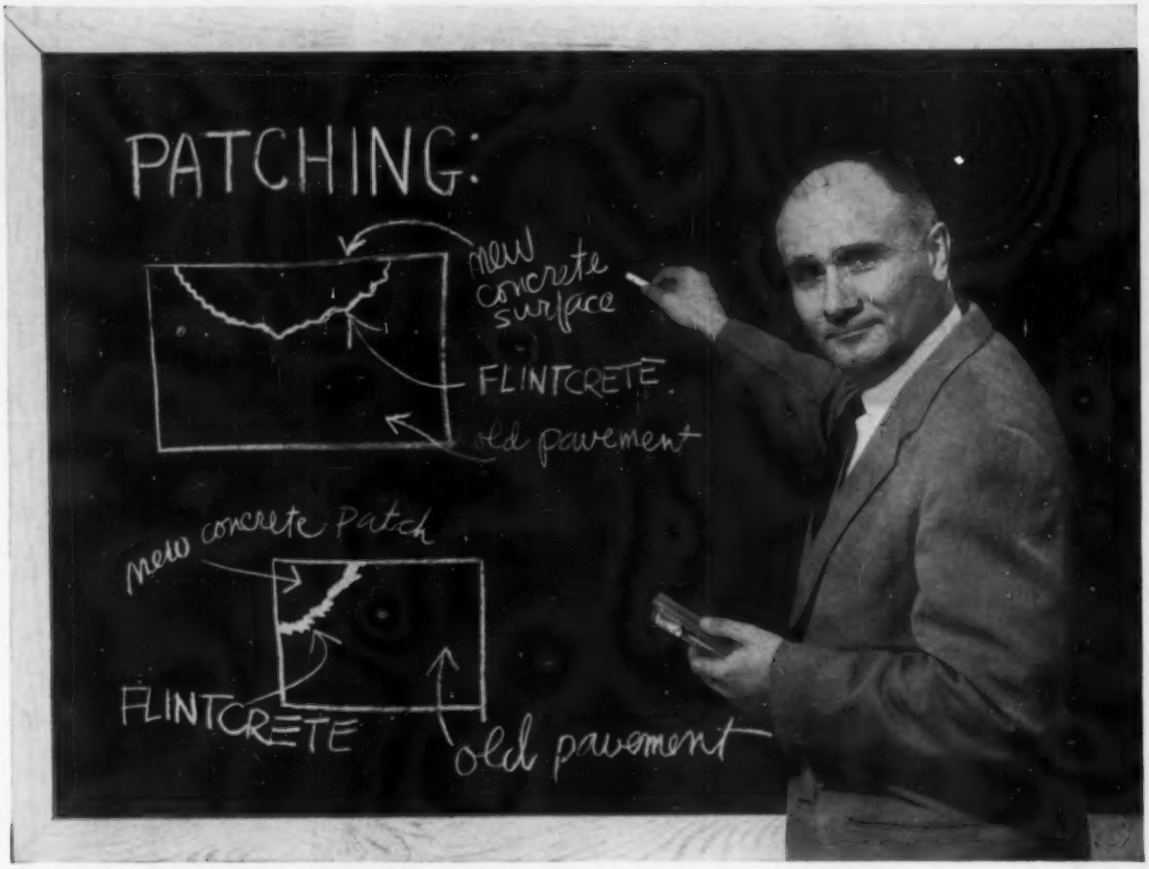
Warrants for lighting freeways 1 million

Current expenditures for highway research are running at about $17.8 million annually, which is less than 1/5th of one cent out of every public dollar spent for highway construction, maintenance, and administration.

The recommended program, in its entirety, would boose annual research expenditures by 38%. In each of the priority cases above, the HRB Committee also recommended whether financing should be sought from special public funds, or private sources, such as foundations and industry.

The 19 research areas given high priority by the committee were screened from 101 specific proposals submitted by committees of the Highway Research Board, from state highway departments and individual research engineers.

Chalk talk by paving specialist "Bob" Snyder on Flintcrete—
Flintkote's amazing new polysulfide/epoxy bonding compound...



"It's a fact! New Flintcrete* lets you do concrete patching never before possible."

"The secret's in Flintcrete's bonding power. It can bond concrete to concrete in a 'weld' up to 12 times stronger than concrete itself.

"This extremely high bonding strength really pays off when you're preparing existing concrete surfaces for repair. It's not necessary to remove the slab; only the unsound area need be cut away. And be certain you use a quality compound—the right one for the job at hand."

Flintcrete can be used for a wide range of other jobs too:

- bonding overlays to existing concrete surface
- bonding precast materials, markers, refractory brick
- skid-proofing pavements
- surface sealing

We'll put you in touch with a qualified distributor or one of our Flintkote paving products representatives. He knows our full line and can help you.

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Improper shimming (described in text) caused this crankshaft failure. The crankshaft broke, as shown, the cylinder block cracked and the rear faces of all the main bearing caps and supports in the block were gouged because of a great forward thrust on the crankshaft.

Why Crankshafts Fail

When an engine fails in a serious mechanical way, the owner may instinctively blame the manufacturer. Company representatives, investigating such failures, are often met with such remarks as, "Your engine broke a crankshaft and ruined our torque converter," or "Your engine has failed and we expect you to give us a new engine, or at least a new crankshaft and cylinder block."

Although engine builders often recompense owners for engine damage resulting from crankshafts and other engine components that fail because of "defects in materials or workmanship," facts accumulated over the years prove that the odds are heavily in favor of crankshaft failures being caused by some external force or condition.

No matter who builds the engine, crankshafts and bearings are not designed to withstand the extreme stresses that can be exerted on them when various types of power take-offs are misaligned, improperly positioned endwise, or so designed that they can exert abnormal forces on the crankshaft.

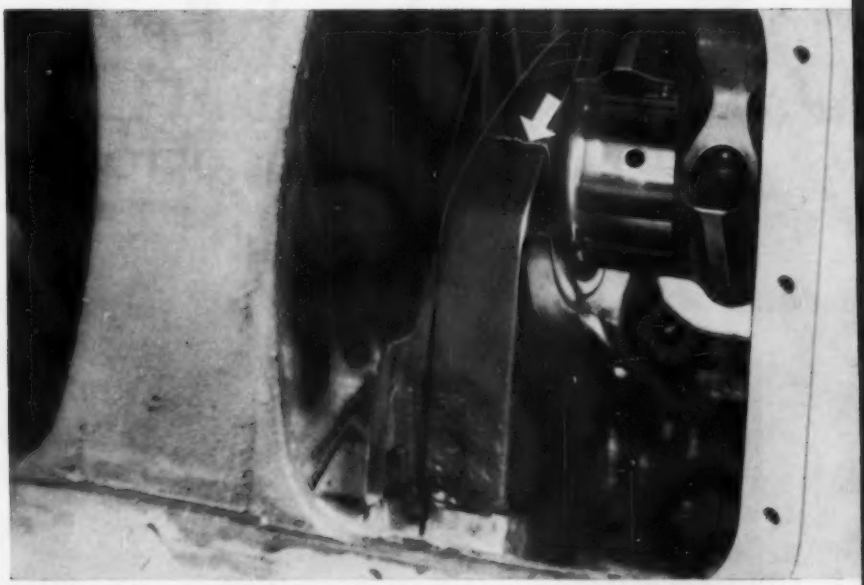
Clutch Must Be Right

Recently a relatively new engine on a drilling rig experienced a severe seizure of the rear main bearing which ruined the crankshaft, as well as the cylinder block. Damage was nearly $10,000. The engine was driving directly into an air clutch. An on-the-job check revealed that the inner drum of the clutch was extremely misaligned in relation to the outer drive ring. The extreme side loads exerted on this engine's flywheel and crankcraft caused the rear main bearing to seize the full length of its bore, generating so much heat that both the crankshaft forging and cylinder block casting cracked beyond repair.

Alignment of air clutches is critically important. The higher the air pressure in the boot, the closer the alignment must be, to keep the side loads within safe limits. Misaligned air clutches can cause failure in any member to which they are fastened, be it a diesel engine, a torque converter, compound, pump or some other attachment.

In another case, several diesel engines powering torque converter-equipped excavators experienced rear main (thrust) bearing failures. The front thrust flange of the rear main bearing became badly scored and, in some cases, broke off. It was found that the power train design allowed the torque converter to exert a linear pull on the crankshaft with thousands of pounds of force under full load conditions. The design was changed by the excavator manufacturer to include a thrust bearing to absorb the pull of the torque converter. And the solid connection of the torque converter shaft to the flywheel was redesigned with the result that bearing and

Torsional vibration fractures are characterized by a break at a 45 degree angle, usually toward the rear of the engine.



High bending-type loads on a crankshaft will usually result in a break which starts in the fillet and progresses through the web.

By W. E. Irwin
Manager, Service Department, Industrial Engine Plant, Caterpillar Tractor Co.

crankshaft failures were eliminated.

Improper shimming caused several thousand dollars' damage to another new engine on a drilling rig. In this case, the engine was driving through a coupling into a torque converter, and the torque converter was driving into an air clutch. The coupling between the engine and the torque converter was not properly shimmed to allow the crankshaft to float. Instead, the crankshaft was pushed forward with great force.

The result was that the rear flange of the rear main bearing was broken off completely. The engine was run to destruction as the crankshaft broke through the web adjacent to the rear main bearing. The cylinder block was cracked through the rear bearing web and the rear faces of all the main bearing caps and supports in the block were severely gouged because of the great forward thrust put on the crankshaft.

It was also found that the air clutch, fastened to the output shaft of the torque converter was grossly misaligned which, in all probability, was responsible for complete failure of the torque converter.

Various physical and metallurgical analyses can be employed to determine if a particular crankshaft failure was caused by manufacturing defects. The type of failure also tells a lot about the cause and gives clues helpful to correcting the problem and preventing failures.

Typical failures:

1. Side loads on the crankshaft can break down the oil film in the bearing, causing seizure. High end loads on the crankshaft not only can score the thrust surfaces of the bearings, but can generate enough heat to reduce the bearing clearance to the point of seizure. Continued running will usually result in a jagged, complete crankshaft fracture near the fillet.

2. High bending type loads, usually from misalignment of driven machinery, can start a crack in the fillet at the main bearing journal which progresses through the web to the adjacent road bearing journal.

3. Torsional vibration normally fractures a crankshaft at a 45 degree angle. The wide use of torsional vibration dampers keeps this type of failure to a minimum. However, the damper can become overloaded because of added driven equipment or the damper can become damaged. Overspeeding may introduce additional torsional vibrations that can be damaging.

Modern, heavy-duty diesel crankshafts and bearings are not usually manufactured with defects. Failures are usually the result of external forces created by conditions beyond the control of the manufacturer. Physical and metallurgical tests can show whether or not the engine builder is at fault.

You asked for a BETTER SHEEPSFOOT for *Clay* Compaction

MODEL CF-30

VIBRO-PLUS *has produced one with* Vibratory Action

GROUND PRESSURE - 5000 to 6000 PSI

Single, double or triple hitch — you're off, towed behind a small crawler to both aerate and compact in a couple of passes . . . Drying processes of material are greatly increased — vibratory action breaks up lumps, brings up water, lets you compact more quickly . . . On a recent Ohio test, for every yard a 5-ton sheepsfoot put in place, the Terrapac CF-30 vibratory roller, first of its kind, laid down nine yards . . . Tests show it laid down 18" lifts of glacial fill, and compacted it to 90 standard proctor in three passes at 2 to 3 miles per hour . . . Results? You can't do better! . . . This is what you've been waiting for, now you have it . . . Contact your local Vibro-Plus distributor for technical information on the CF-30 sheepsfoot aerator-compactor.

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VIBRO-PLUS VB TERRAPAC

VIBRO-PLUS PRODUCTS, Inc.

STANHOPE, NEW JERSEY

WORLD'S LEADING MANUFACTURER OF VIBRATORY EQUIPMENT FOR OVER TWO DECADES.

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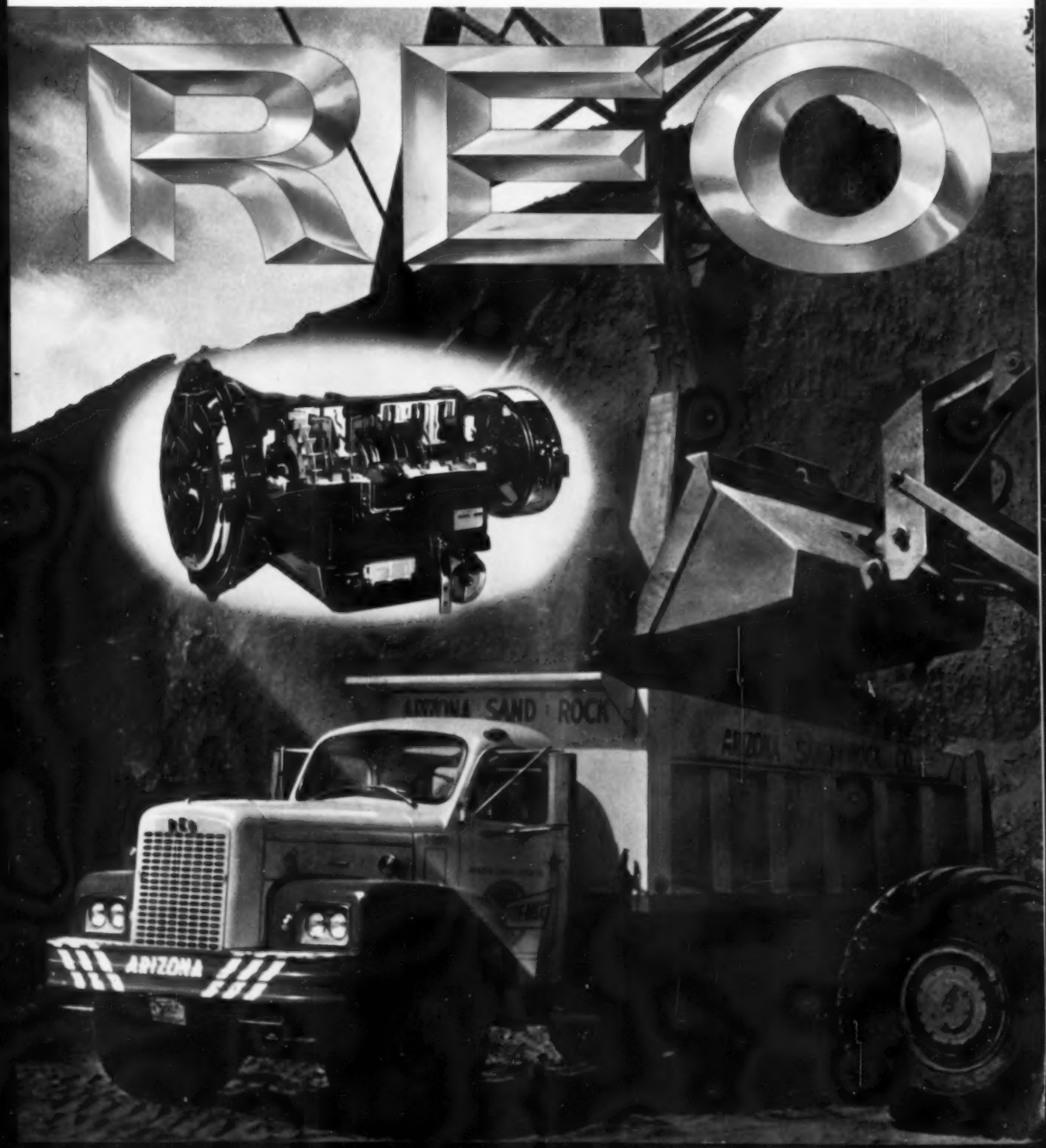
"ReoMatics save 6½¢ per mile for Arizona Sand & Rock," reports Ralph Greer, Equipment Superintendent.

On a fleet-wide basis with each unit averaging 20,000 miles per year, Arizona Sand & Rock pares its operating costs by **6½¢ per mile through the use of automatics over straight sticks.** ASR's Reo dumps and mixers are equipped with **Reo Gold Comet Engines and ReoMatic transmissions.** Prime reason for ASR's standardization on automatics is to relieve costly shock load damage to drive lines and speed up delivery service to customers.

REO DIVISION, The White Motor Company, Lansing, Michigan.

Gold Standard of Values



REO LIFETIME POWER

Every Engine in the Line Wet Sleeve Constructed

The engine is the heart of the truck, and no truck can be better than its engine. Horsepower, type of fuel, ease and cost of maintenance, performing ability and suitability are important factors to every trucker's profits.

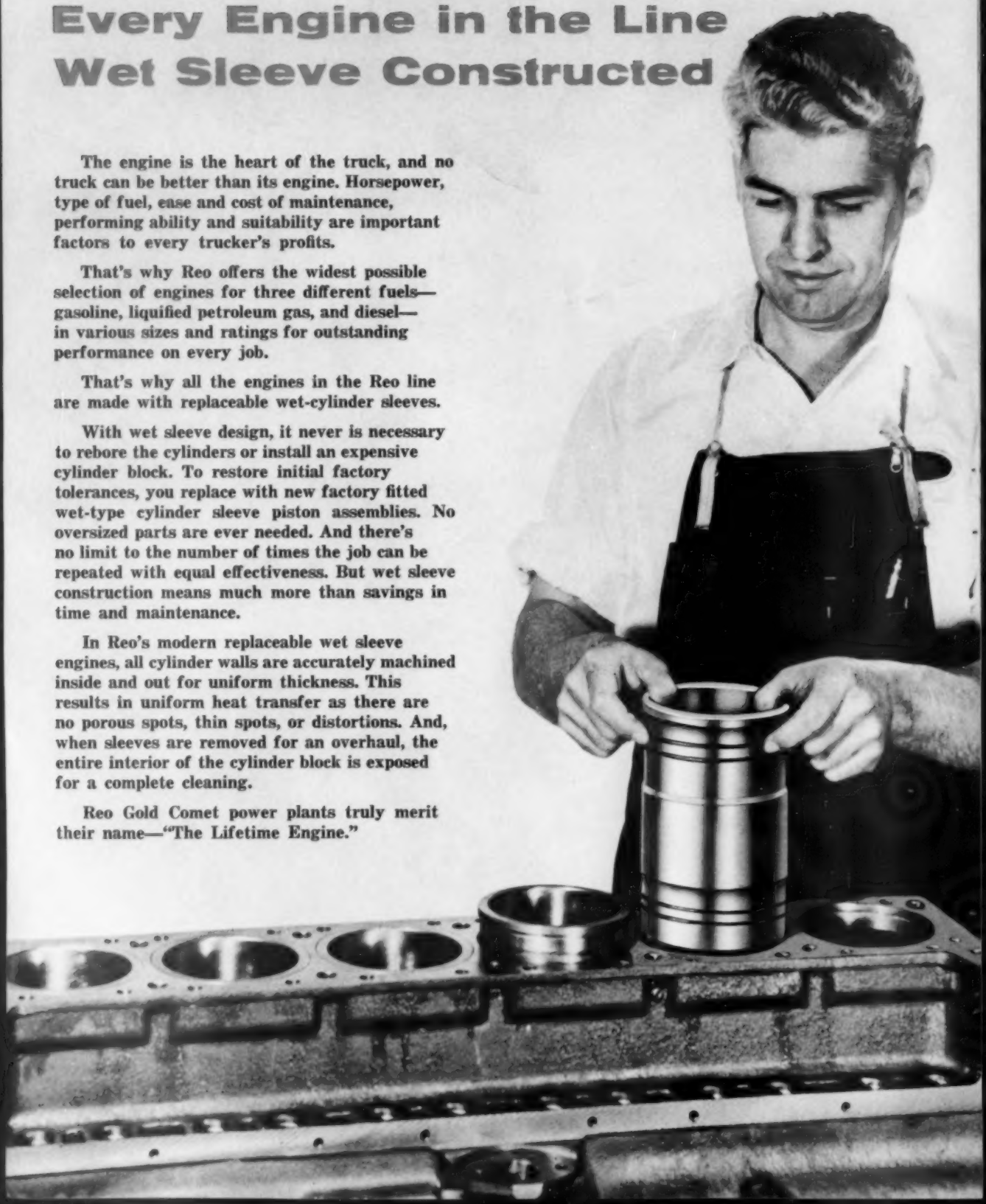
That's why Reo offers the widest possible selection of engines for three different fuels—gasoline, liquified petroleum gas, and diesel—in various sizes and ratings for outstanding performance on every job.

That's why all the engines in the Reo line are made with replaceable wet-cylinder sleeves.

With wet sleeve design, it never is necessary to rebore the cylinders or install an expensive cylinder block. To restore initial factory tolerances, you replace with new factory fitted wet-type cylinder sleeve piston assemblies. No oversized parts are ever needed. And there's no limit to the number of times the job can be repeated with equal effectiveness. But wet sleeve construction means much more than savings in time and maintenance.

In Reo's modern replaceable wet sleeve engines, all cylinder walls are accurately machined inside and out for uniform thickness. This results in uniform heat transfer as there are no porous spots, thin spots, or distortions. And, when sleeves are removed for an overhaul, the entire interior of the cylinder block is exposed for a complete cleaning.

Reo Gold Comet power plants truly merit their name—"The Lifetime Engine."



Completely portable Lima A-W crushing installation has primary 20 by 36-in. jaw crusher, Model 101-CE secondary plant and 7-yd. surge bin. Delivers exceptionally high production for Maymead Lime Co. in Tennessee.

How Lima Austin-Westerns BEAT RISING COSTS!

Higher output, lower maintenance. These two cost reducers are characteristic of Lima Austin-Western Crushing, Screening and Washing equipment.

Advanced engineering design assures top operating efficiency for years—free of maintenance problems and costly downtime. Improved manufacturing processes and extensive use of anti-friction bearings and heat-treated alloy steels also add to the dependability of this rugged, precision-built machinery.

Lima A-W offers a complete crushing, screening and washing line including jaw and roll crushers, matching screens, conveyors and bins. Stop increasing costs; learn how Lima Austin-Western meets your exact needs for low-cost, accurately sized specification materials. See your nearby distributor or write to Baldwin-Lima-Hamilton Corporation, Construction Equipment Division, Lima, Ohio.

Lima Austin-Westerns available for stationary or portable installation.

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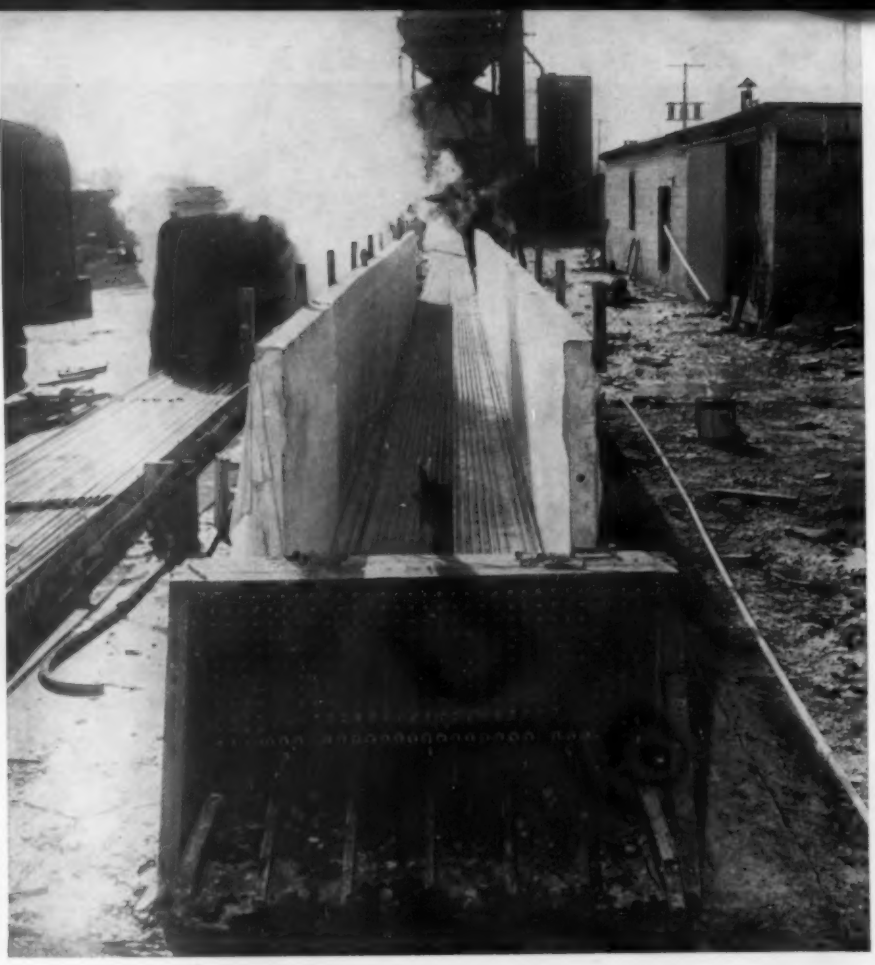

At Dixie Concrete Pipe Company plant—manufacture of box bridge beams for an Interstate highway project in Putnam County, Tennessee. The forty-one 3/8-in. diameter stress-relieved strand pattern, used in each member, is initially stressed with a force of 287 tons. The beams, 78½ ft. long, 42 in. deep, and 36 in. wide, are designed to support an H20-S16-44 highway loading.

Stress-Relieved Strand Available

After extensive research, Bethlehem Steel Company recently has perfected an induction heat treatment method for stress-relieving strand for prestressed concrete. The precise temperature control and other features of the induction heating used produces a stress-relieved strand with uniform mechanical characteristics from reel to reel, as well as within the individual length contained on a reel.

By its very nature, notes a Bethlehem engineer, the hard-drawn high-carbon wire used in the manufacture of stress-relieved strand tends to be very stiff and difficult to handle. The combination of preforming the individual wires as they are stranded, and Bethlehem's method of stress-relieving, yields a strand which permits ease of handling and is free from undue wildness. This ease of handling becomes self-evident to the crews working the material on the casting beds.

The primary purpose of stress-relieving is to improve the elastic properties of the strand and to permit higher working loads than might otherwise be considered feasible.

Stress-relieving by the induction method is considered preferable to the more conventional methods by reason of the more accurate control features which were designed and incorporated into this process. Furthermore, such stress-relieved strand produced by this method is cleaner and presents a surface which will readily bond with the concrete.

All Bethlehem stress-relieved strand is manufactured to the exacting requirements of ASTM Specification A 416-57T, and as such is a 7-wire strand in sizes ranging from ¼-in. to ½-in. diameter.

Bethlehem facilities can produce long lengths of continuous stress-relieved strand in single reels when desired.

OCT. 20, 1952: 4″ SNOW—WILKES-BARRE-SCRANTON, PENN.
OCT. 10, 1954: 6″ SNOW AND SLEET—CLEVELAND, OHIO
OCT. 25, 1955: FREEZING RAIN—CHICAGO AND DETROIT
OCT. 24, 1956: 3″ SNOW, FREEZING RAIN—SOUTH DAKOTA
OCT. 18, 1959: 3″ SNOW—NORTHERN NEW ENGLAND

(Source: U. S. Weather Bureau Climatological Data)

1960?

Prepare for early storms—
order STERLING ROCK SALT now

If you're caught without rock salt, early storms can paralyze traffic, cause serious accidents, mean heavy business losses. Don't let this happen to you! Stockpile your Sterling Rock Salt now and stockpile enough. (When treated with Storite, Sterling Rock Salt can be kept from caking even in outside storage.) Order *now* from your nearest International Salt Company sales office.

INTERNATIONAL STERLING SALT SALT COMPANY
"A STEP AHEAD IN SALT TECHNOLOGY"

BUFFALO • BOSTON • CHARLOTTE • CHICAGO • CINCINNATI • DETROIT • NEWARK • NEW ORLEANS • NEW YORK
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BRONX APPROACH TO THROGS NECK BRIDGE

Weather resistance of basic lead boosts protection of steel

M50® basic lead silico chromate pigment makes this long-lasting protection possible.

12,955 tons of steel are going into the Bronx approach to Throgs Neck Bridge . . . now being constructed for New York's Triborough Bridge and Tunnel Authority.

To prevent construction delays, steel was stock-piled at both shop and job well in advance. For this reason, and because of the erection schedule, it was anticipated that some of the steel would be exposed to weather for a year or more before final painting.

Full protection against rust during this long period might have been obtained by requiring repriming of the steel in the field. But it was easier, surer and less costly to specify, instead, a shop primer which contains basic lead silico chromate pigment.

Unlike any other rust inhibitor, basic lead silico chromate pigment combines corrosion inhibition of a high order with enduring resistance to weather. The pigment contributes both properties to paint made with it. In exposure tests at National Lead Companies Test Station at Sayville, L. I., *M50* alkyd primers

More than a year of weathering in the field and during construction had to be anticipated before the *M50* maroon intermediate coat could be applied. Despite long exposure an *M50* shop primer does not chalk or leach away. With both the primer and the intermediate coat containing the active rust inhibitor pigment, basic lead silico chromate, this steel will be defended *in depth* against corrosion. Both coats will continue to provide full anti-corrosive action for years to come.

silico chromate shop primer during long exposure

3 mils thick have endured ten years of weathering with no finish coats to protect them.

In similar tests, finish coats were applied in a wide variety of colors on bare steel. These coats have given primer-type protection against rust formation.

So, for the first time, in addition to the primer all following coats of the paint system can contain an active rust inhibitor to provide "Defense-in-Depth" against corrosion.

For information...

For details about these modern anti-corrosion paints and paint systems formulated with *M50* basic lead silico chromate pigment, contact your regular paint suppliers.

M50® an **oncor**® *Pigment...A Development of* **National Lead Company**

General Offices: 111 Broadway, New York 6, N.Y.

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With the tracks spread to 72 inches, the tractor can bridge obstacles (such as the culvert) during mowing operations.

Heavy-Duty Mower Has Wide Tracks

The problem of mowing high grass and weeds on 1½:1 embankment along southern California's freeways has been tackled by an enterprising equipment firm. The result is a modified Case 310 crawler type tractor with a side-mount, two-blade rotary mower that cuts a 57-inch swath.

The Kelley Dump Truck & Equipment Co. of Buena Park, California, ordered the small crawler type Case tractor with tracks expanded to 72 in. center to center. A Service model 57 gyro stalk shredder with a hydraulic motor was adapted to the track framework, and fitted with a hydraulic ram that can swing the rotary mowing unit up and down. A hydraulic pump fitted to the tractor engine drives the hydraulic motor on the mower and powers the ram.

The widely spaced tracks permit the unit to mow across steep embankments with safety and without disturbing the fill. The rotary mower, which can be set to cut as low as 2 in. from the ground, can be angled up or down by the operator as he mows. This permits narrow, steep embankments to be mowed while the tractor travels along.

Concrete Adhesives With THIOKOL Liquid Polymer

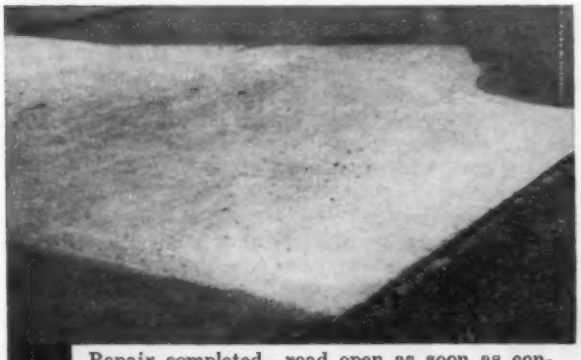
MAKE LITTLE OF BIG REPAIRS

1. Scaled highway surfaces are being lastingly repaired in only a few hours by bonding new concrete to old with adhesives containing THIOKOL polysulfide polymer. The bond is stronger than concrete itself. Field and lab tests prove it.

2. Only loose and damaged concrete—not the whole slab—need be removed. The adhesive also cuts time and costs in repairing spalled areas, cracks, pot holes, in skidproofing and sealing, in fastening traffic markers. Results are long-lasting.

3. Adhesive with THIOKOL liquid polymer—made and sold commercially by several processors—is spread on prepared surface with brooms or heavy brushes. Thirty minutes later, while adhesive is still tacky, new concrete is poured.

4. Concrete is laid conventionally. It can also be worked out to a feather-edge without danger of later failure—so tenacious is the adhesive bond of new to old concrete.



5. Repair completed—road open as soon as concrete is cured. Similar repairs, in service since 1953, show no damage or effects of weather, wear and tear, even on the busiest highways.

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Please send me THIOKOL'S helpful booklet "A New Type of Concrete-to-Concrete Bonding." Tells how to reduce remedial time and costs, and to keep roads in service.

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®Registered trademark of the Thiokol Chemical Corporation for its liquid polymers, rocket propellants, plasticizers and other chemical products.

More Rules of Thumb for Concrete Mixes

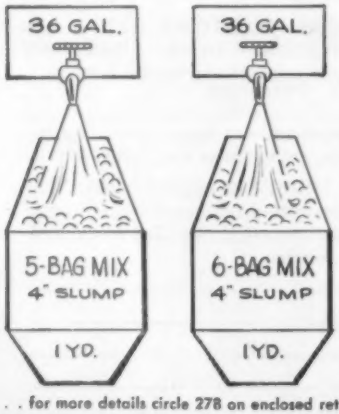
This is the second set of rules of thumb offered by Alpha to guide you in making changes in concrete mixes. Note that these methods are recommended for approximations only. Depend on engineering assistance whenever available.

1. Changes in Cement Content

For each sack increase in cement content, subtract 80 lbs. of aggregate. For each sack decrease in cement content, *add* 80 lbs. of aggregate.

2. Maintaining Same Slump of Non Air-Entraining Mixes

Changing the cement content of non air-entraining mixes—and maintaining the same slump—requires no appreciable change in *total* water per yard. Bear in mind that total water includes free moisture in aggregates.



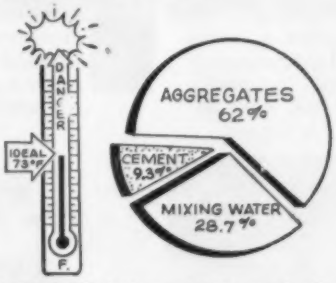
3. Sticky Concrete

Sticky concrete is usually due to too much sand or too much air. To reduce stickiness:

a. reduce amount of air-entraining agent, but check with air meter to assure sufficient air content.
b. reduce sand 50 lbs. and increase coarse aggregate 50 lbs. If stickiness remains, repeat.

4. Reducing Mix Temperature

The effects of the temperatures of concrete ingredients on the mix are indicated by the approximate percentages shown below.



1. Sprinkle hot-aggregate stock piles with water or use fog sprays to cool the aggregate.
2. Apply fog sprays to operating conveyor belts and to coarse aggregates in bin storage.
3. Use crushed ice in the mix, replacing water pound for pound.
4. Avoid stock-piling aggregates directly in the sun if possible. Shade coarse-aggregate bin storage.
5. Protect or insulate mix-water storage tanks and water lines from direct rays of the sun.
6. Avoid the use of strength accelerators in hot weather.

One or a combination of the above suggestions should enable reduction of concrete temperature to a safe level.

5. Changing From Regular to Air-Entraining Mix

To maintain the same strength when changing from a regular cement mix to an air-entraining mix, reduce the water ¼ gallon per sack of cement and sand 10 lbs. per sack of cement *for each 1% of entrained air.* The adjusted mix will have a higher cement content.

6. Adjusting Lightweight Mix

If a lightweight mix is designed for dry aggregate, and damp aggregate is used, a quick adjustment in the mix is necessary. This can be made without changing the mix design too much, as follows: Subtract the weight of the added water from the total water. (This is assumed to be the absorbed water.) Divide and add this weight equally to the fine and coarse lightweight aggregates. If concrete sand is used in the mixture, it should be remembered that the adjustment should be made in the lightweight aggregate proportions, *not* in the sand.

Reprints of this advertisement are available on request.

How to stretch tax dollars . . .

Breaker bar attachment provides greater pulverization to hard materials

PETTIBONE WOOD PULVERIZER

Crushes in-place rock or asphaltic materials for low cost re-use

You can stretch tax dollars farther and complete jobs quicker with the PETTIBONE WOOD PULVERIZER . . . the only machine that scarifies and pulverizes old pavements, hard soils or rock in one operation!

The MODEL P-650 PULVERIZER takes up to a 6 to 8 inch cut compacted depth 6 feet wide per pass . . . and processes up to 1200 tons per hour. 12 inch maximum material crushed to 1½ inch minus.

In soil blending, the P-650 takes up to a 12 to 16 inch cut and prepares up to 1500 to 2000 cu. yds. per hour in blending with water to obtain high density.

Other features include: Self-contained Diesel engine for pulverizing (towed by a crawler tractor); low operating cost . . . tractor and pulverizer operator handle work normally requiring more equipment and manpower; accurate depth control with hydraulic jack; adjustable breaker bar and grids; adequate pulverization . . . material retained in pulverizer drum for a longer period for better breakage of the aggregate.

Pettibone Wood stabilization equipment is used for highway, airport and parking lot construction the world over. Write today for free job studies and your copy of "The A B C's of Soil-Cement Stabilization", an informative, 36 page booklet on stabilization techniques.

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Euclid rear-dump and Cat D8 team up to shove rock into the stream

Dumped Rock Helped Save Detour Bridge

When a contractor builds a detour bridge that must serve for a considerable period — and do so in a turbulent, high velocity stream — scour is one of the lurking enemies he must contend with.

This is the lesson learned from the experience of H-E Loudermilk, contractor, of Denver, Colorado, in building a long-duration detour structure on US 6-40 relocation. This is the rugged canyon section described in Roads and Streets, Octcber, 1959.

In spanning Clear Creek to accommodate heavy transcontinental traffic, the contractor had the option of either driving piles or pouring 1′ x 2′ x38′ concrete footings to support the timber structure. The governing factors were stream flow at various times of the year, and the rocky nature of the soil. In winter Clear Creek is practically dry. During the spring and early summer the creek flows rapidily with an approximate depth of 3 to 4 ft., for the full channel width. The contractor's decision was to pour concrete footings.

The footings were excavated about 5 ft. below the stream bed to insure stability. The bridge was well constructed, and ordinarily would have stood up admirably under the prevailing conditions.

However, trouble started with the cracking and settling of the bituminous pavement against the south end of the bridge. The contractor had not accurately predicted the exact lcoation or depth of scouring that occurs when high velocity water tends to undercut the stream channel. In this particular case a moderate channel change took place at the bridge site. As the settling of the pavement widened and deepened, it became immediately evident that the south bent was settling.

Fortunately for the outcome of the situation, the bridge settling was so gradual that it gave suffiient warning. Resident engineer Rueben Hopper's first action, when he understood what was going on, was to take a hurried sounding of the channel. He found that the concrete footing was entirely exposed, and scouring was progressing to the point were the footing was being dangerously underminded.

The conditions called for immediate action. If major repairs were required the whole project would

have to shut down, and traffic would have to be rerouted back along the toe of the rock cut on the north side, making normal grading operations impossible. This project also had an inflexible September 1 completion date, with a high liquidated damage rate.

Various alternatives were considered. Rebuilding of the footing in high water would result in a lengthy delay and the use of sheet piling. A decision was made to partially dam the stream below the bridge in such a manner that the stream would redeposit silt in the weekened footing area. Rear-dump Euclids dumped the largest avilable rocks immediately below the threatened pile bent. A cat D8 then pushed them into place. The pavement stopped settling immediately, and a load of road mix restored the pavement.

A large equipment trailer was used by the contractor to get the D8 on the job quickly, and to prevent crawler track damage to the detour pavement.

Chart Speeds Deep Sheeting Estimates

Estimates for structures to support a deep excavation are aided by a chart now available. The desired engineering data can be selected in 30 seconds from this chart developed by Contact Sheeting, Inc., division of Coakley & Booth, foundation contractors in New York City. This firm installs or rents a clip assembly (patent pending). Theory and analysis of soil pressures for granular soils involved in the method were developed by Professor Donald M. Burmister of Columbia University.

The design is reported to be applicable and safe for deep excavations for highways, bridges, subways, sewers, building foundations and other heavy construction projects. From the chart, the designer or estimator can select the size and spacing of all the structural components; vertical soldier beams, timber sheeting, horizontal wales and their supporting rakers. The method covers drainable soils, but *not* highly plastic clay soil.

The new CS system is used to advantage with the conventional soldier beam system of supporting earth during excavation. Use of the CS clip assembly can save up to $1.00, or more, per sq. ft. of sheeted area, it is claimed. Labor and time are reduced. Actual time studies on jobs have shown that sheeting installation was speeded by 100 to 200 percent using smaller crews.

The contact sheeting system of supporting deep, tight excavations is used in lieu of interlocking steel sheet piling under certain conditions. These include wet ground, where bracing has to be minimized in tight working areas or with limited headroom, where obstructions are encountered, and where vibration is present.

SINCE 1954 THE NEW JERSEY state highway department had added 33 creeper lanes on the state system to improve the safety and capacity of two-lane highways in rolling or mountainous terrain.

"WE NEED HIGHEST QUALITY MATS.."

Giesen & Latson Constr. Co., Austin Texas, use Barber-Greene 879-B and 873 finishers to pave closely checked jobs in state capitol

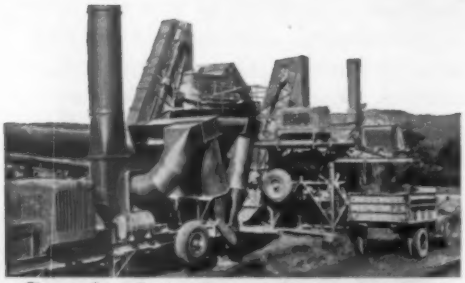
Finishing asphalt paving in Austin, Texas, is the same as in any state capitol—a "fishbowl" operation with all the top state highway department brass viewing results.

But these working conditions are just fine with E. W. Giesen, partner in Austin's leading paving firm—Giesen & Latson Constr. Co. He states: "We know we need highest quality mats because of close scrutiny given our jobs. We get mats that pass every inspection from both our Barber-Greene 879-B and smaller 873 finishers.

"Furthermore," he adds, "our 879-A finisher paved 300,000 tons in three years and set a maintenance record that influenced our buying two new

PARTNER E. W. GIESEN, right, and Dan Dyes, the firm's supt. of asphalt hot mix construction, both like the mat quality, low maintenance, and flexibility of operations they get with the Barber-Greene 879-B and 873 finishers.

TEXAS "JACK RABBIT." The firm's 873 Barber-Greene finisher really gets around, handling the small, scattered jobs and working teamed with the 879-B on big jobs. The unit paves on tracks, travels on rubber tires.



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..WE GET 'EM WITH BARBER-GREENES"

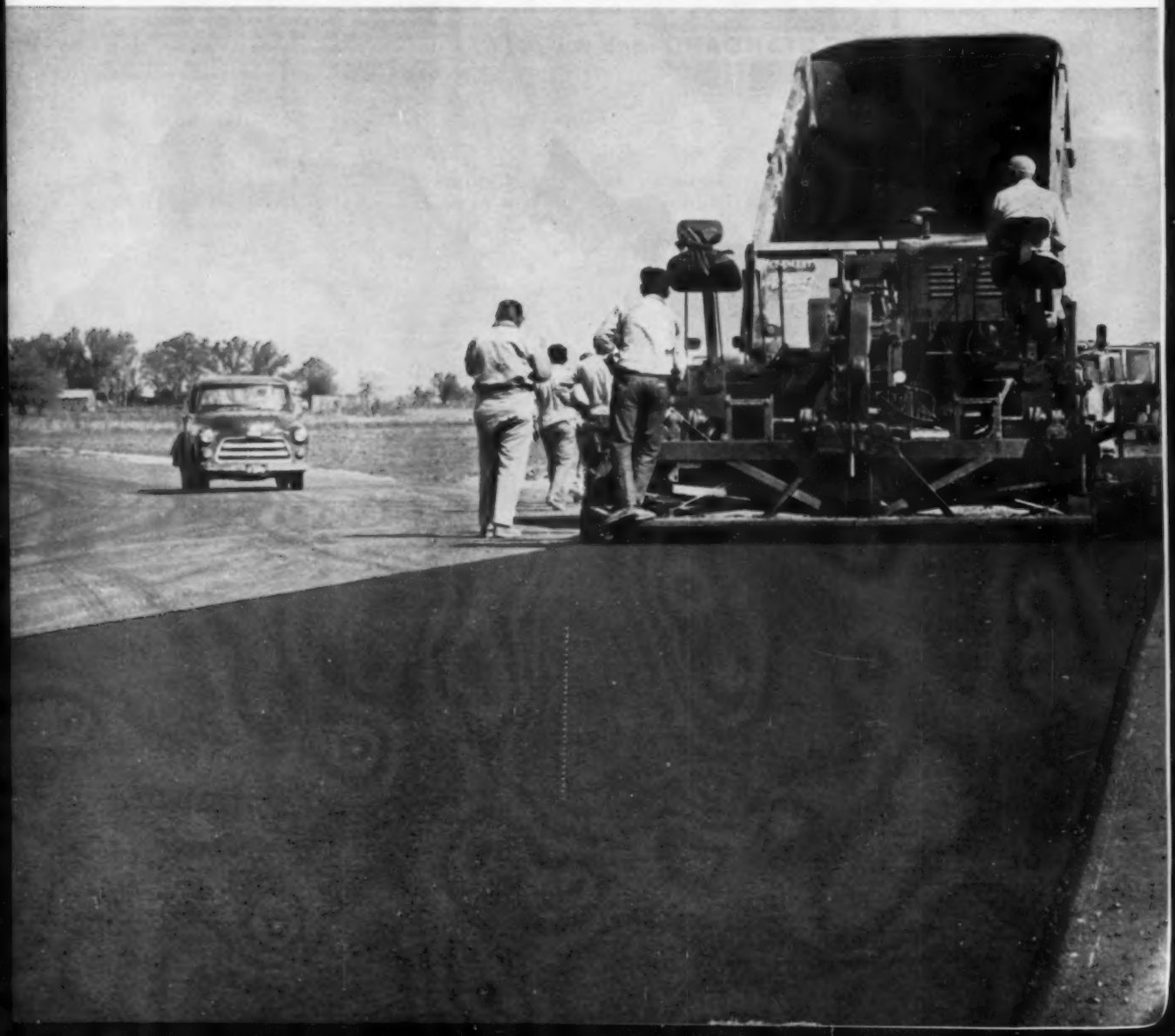
Barber-Greenes."

Use Side-by-Side Setup—This Austin firm's contracts run about 40% city work and 60% highway jobs. Wherever possible on highway jobs with interchanges, Giesen & Latson work both finishers side-by-side. This arrangement gives them a wide range of paving width combinations that speed contracts while maintaining top quality standards.

Below, the 879-B finisher is shown paving three 12′ lanes on Interstate Highway 35 north of Austin. Lifts consist of a 1½″ base course on Texas Type C mix and a 1″ surface course of Type D. Operating consistently at 50 fpm, the 879-B handles 20-ton trucks. Both Barber-Greenes easily handle all the varying mat widths required. Extensions and cut-off shoes give width ranges from 8-14′ on the 879-B machine and from 6-12′ on the 873.

5 Big Buys in No. 1 Finisher Line—Before you buy your finisher, check your Barber-Greene Distributor and discover why his machines were No. 1 choice of 82% of the asphalt paving contractors in a 1960 nation-wide poll. This great line includes the 879-B and 873 shown here and: two giant heavy duty, high speed machines—the crawler-mounted SA-60 and the pneumatic-tired SB-60; and the SJ-50 Road Widener and Shoulder Paver, only machine that handles all types of widening and shoulder paving with all materials, including concrete.

"POOL TABLE" SURFACE describes this mat being finished by the Giesen & Latson 879-B Barber-Greene finisher on Interstate Highway 35 north of Austin, Texas. And the 873 lays the same quality mat when working side-by-side with this machine.



FAST DELIVERY—EXPERIENCED TECHNICAL SERVICE

Two big advantages contractors get when buying STANDARD *Asphalt*

Resurfacing old concrete with Asphalt on Illinois Highway 173 between Antioch and the Tollway is typical of the jobs taken on by Skokie Valley Asphalt Company. Backing them up on such jobs is a ready source for Asphalt, less than 25 miles away—the Standard Oil refinery at Whiting, Indiana. Also ready to help them with advice on Asphalt application and to trouble-shoot other problems is an experienced Standard Oil Asphalt representative, Barney Toale. Barney Toale is stationed in Chicago within a few miles of the job. He's on call any time the contractor needs his help.

This kind of service from Standard Oil helps contractors complete jobs on time. The same sort of service is available from Standard anywhere in the 15 Midwest or Rocky Mountain states. Delivery of Asphalt is made from five refineries strategically located for best service to contractors. Experienced Asphalt technical service is likewise available wherever there's a paving job. To get this help, call the Standard Oil office nearest you. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

You expect more from STANDARD *and you get it!*

John Onan (right), Skokie Valley Asphalt Company foreman, and Standard's Barney Toale watch paving operation on Illinois 173. Providing assistance to contractors on Asphalt applications is Barney's job. He's been rendering service to customers for 22 years. He's completed Standard's Sales Engineering School course to further qualify him for such work.

Bituminous features appear
between pages 125 through 138.

How Asphalt Grade and Filler Type Affect Pavement Compaction

One of the most important recent investigations bearing on asphalt pavement quality is that conducted by the Asphalt Institute on mix design as related to compaction during construction and densification under traffic.

This research has explored particularly the effects of the consistency (penetration grade) of the asphalt cement and the types of mineral filler used. A paper on this study was given at the Memphis meeting (January, 1960) of the Association of Asphalt Paving Technologists by B. F. Kallas and H. C. Krieger. The authors are respectively assistant engineer of research and laboratory technologist at the Institute's headquarters laboratory at College Park, Maryland.

Those who may wish the full details of this paper must await the AAPT's 1960 proceedings. Meantime this review covers some of the highlights.

In designing mixes for heavy loads and high tire pressures during construction, one factor has grown in importance. [This is the balance existing between the volume of asphalt and aggregates in relation to the volume of a given pavement throughout the life of the pavement structure.] After a mix design has been set, and the mix produced on the job, the volume of asphalt and aggregate in relation to the total volume of a given pavement mass is directly dependent on the state of densification that results both from construction and traffic compaction.

As a design principle, experience has proved sound the use of the highest asphalt content possible in a paving mix, consistent with maintaining adequate stability for the loading conditions anticipated. A recognized asphalt mix design requisite is the establishment of laboratory compactive efforts that produce densities corresponding to those anticipated in field pavements. If the pavement is compacted to laboratory design density or closely approaches it, enough voids are left to provide for a slight amount of additional compaction under traffic loading without flushing, bleeding or loss of stability. The retention of a small volume of air voids in the compacted paving mix is important in maintaining adequate stability under repeated heavy loading conditions.

Field tests by Foster and Sale (HRB Proceedings, Vol. 38) show today's heaviest wheel loads and highest tire pressures can be achieved in mix design by reducing the asphalt content as pavement densities are increased. As a design principle, the decrease in asphalt content to compensate for increasing densities may lead to greater pavement brittleness and a decline in pavement durability. Recent laboratory investigations by Monismith on the flexural characteristics of paving mixes have indicated that the effect of asphalt content is quite pronounced. Mixes with a higher asphalt content offer greater resistance to fatigue. An important additional factor in arriving at an economical mix design is that the angular, high strength and rough surface textured aggregates known to produce high stability mixes may not be readily available in some areas.

Kallas and Krieger in their Memphis AAPT paper reported on their laboratory investigations into the effects of the consistency of asphalt cements with certain mineral fillers on compaction. This study's purpose was to determine if the asphalt consistency and mineral filler effects might be significant factors in designing mixes of higher than normal stability with high asphalt con-

tent, suitable for the heaviest loading conditions.

Three asphalt cements were used in the study: standard 85/100 and 40/50 penetration grades, and a 170° F. softening point grade of asphalt meeting Asphalt Institute specifications for undersealing portland cement concrete pavements. The coarse aggregate was a crushed trap rock from Maryland and the fine aggregate was a Maryland natural sand. Mineral fillers were a commercially produced limestone dust, a combination of limestone dust and diatomaceous earth, (Johns Manville, Celite-292) and Type III portland cement. In the case of the mixes containing the diatomaceous earth, 1.5 percent by weight of the total aggregate was used. In all of these mixes, aggregate weight fractions were adjusted to have 6.5 percent of the total volume of aggregate passing the No. 200 sieve. A combined aggregate gradation for these mixes is shown in Figure A.

A second series of tests was made using the same aggregates but of slightly different gradation. For these mixes, a combination of limestone dust and short asbestos fiber (Johns Manville grade 7M) filler was used. One and one-half percent by weight of the total aggregate was asbestos fiber. The fraction passing the No. 200 sieve was 7.2 percent of total volume of aggregate. In these mixes a portion of the Maryland sand fine aggregate fraction was replaced with trap rock fine aggregate to produce a combined aggregate having 80 percent of crushed particles.

All test specimens were compacted by a mechanical gyratory compactor, built from plans prepared by the U. S. Army Waterways Experiment Station, Corps of Engineers. (The compactor exerts a combination of a static load and gyratory motion similar to the Texas gyratory method.) Compaction is possible at temperatures controlled to ±2° F., and continuous measurement can be made of volume change during compaction. In the tests, the gyratory compactor was used for initial laboratory compaction and for additional densification simulating traffic compaction.

Marshall stability and flow tests were made for all test specimens both before and after the testing compaction. Hveem stability tests were also made before and after the testing compaction for the asbestos filler mixes. (A summary of specimen densities, air void contents, Marshall and Hveem test properties is given in the authors' appendix.)

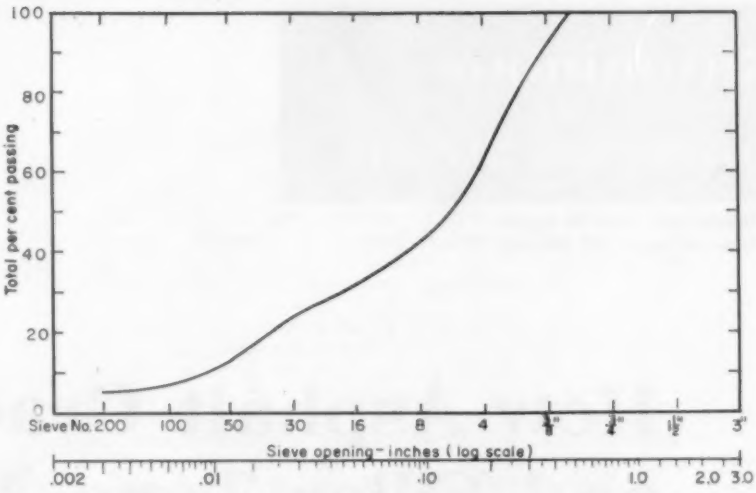


Figure A—Aggregate gradation for Celite, limestone dust and portland cement filler mixes.

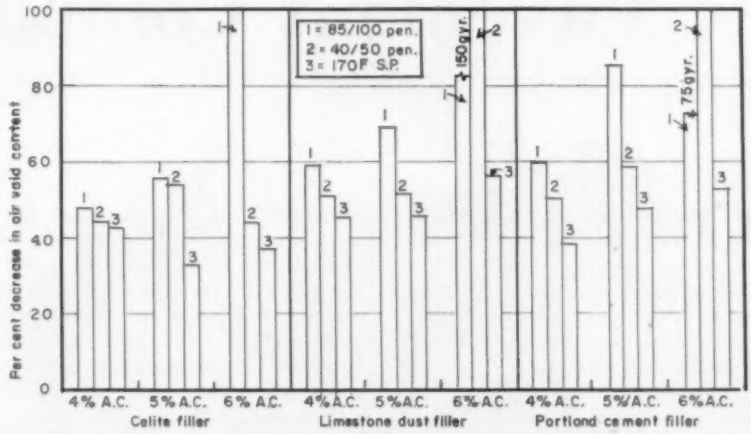


Figure B—Effect of asphalt consistency, type of mineral filler, and quantity of asphalt on percent decrease in air void.

For the purpose of comparing the relative effects on compaction of asphalt consistency and type of mineral filler, the percentage decrease in air void content occurring during testing compaction was considered. Figure B shows the percent decrease in air void content resulting from testing compaction at 140° F for the limestone dust, diatomaceous earth and portland cement filler mixes, using three different asphalts and through the same range of asphalt contents.

These results indicate that the quantity of asphalt is an important factor in the reduction of voids in all test mixes. As the asphalt content increased through the entire range of asphalt contents, so also did the reduction in air voids increase. The data also show a slight decrease in percentage of void reduction as the asphalt decreased in penetration or increased in viscosity. Comparing the effect of fillers on percent of void reduction, it appears that the void reduction in the celite filler mixes is slightly lower than in those mixes containing limestone dust and portland cement fillers, which are about at the same level.

The air void contents of specimens containing the same amount

Continued on page 128

ASPHALT

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The Maine Turnpike is another example of how Asphalt supplied by Esso helped build a better road at lower costs. The Maine Turnpike Authority saved more than $21,000 per mile over equivalent slab type construction. Compare these advantages:

● *Unsurpassed quality* – Asphalt produced by Esso is specially refined from selected crudes to provide maximum pavement strength to resist heavy axle loads and the effects of severe frost.

● *Faster construction time* – No joints, forms, frost protection covering, or curing time required to develop full strength. More road can be completed during working months for earlier opening to traffic.

● *Winter weather resistance* – Asphalt seals out moisture and is unharmed by de-icing salts. Snow and ice naturally melt away faster, too.

● *Greater planning flexibility* – Asphalt provides low-cost flexibility in meeting traffic needs. Strengthening and widening of pavements can be accomplished, providing unlimited years of service, without interrupting traffic.

Can Asphalt supplied by Esso help you build a better road at a lower price . . . with lower maintenance costs? For more information, or technical assistance in your road building plans, write: Asphalt Products, Esso Standard, Division of Humble Oil & Refining Company, 15 West 51st Street, New York 19, New York.

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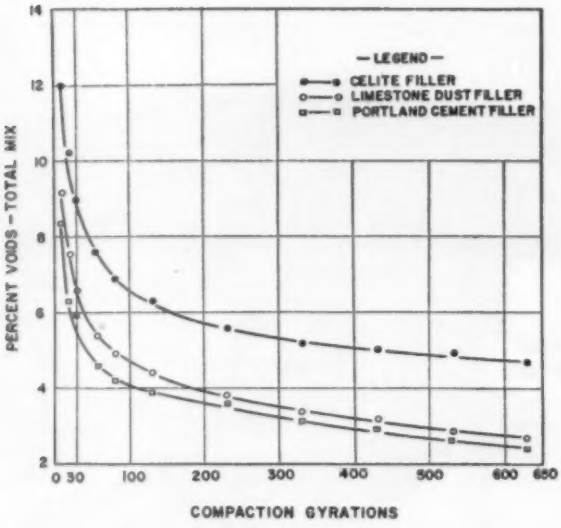


Figure C—Effect of fillers on the compaction of mixtures containing 4 percent of 85-100 penetration asphalt.

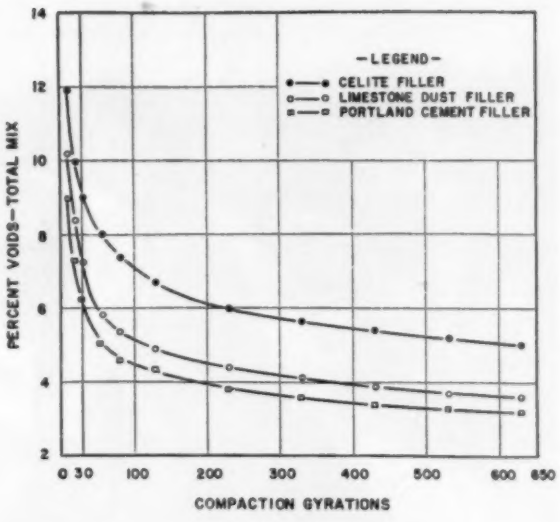


Figure D—Effect of fillers on the compaction of mixtures containing 4 percent of 40-50 penetration asphalt.

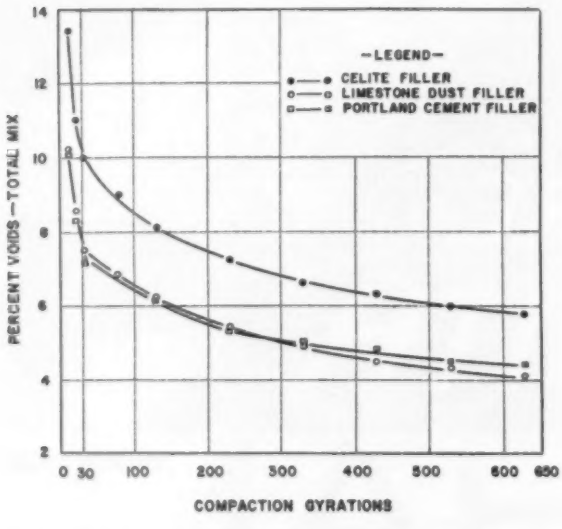


Figure E—Effect of fillers on the compaction of mixes containing 4 percent of 170 deg. F. softening point asphalt.

ASPHALT GRADE AND FILLER TYPE

Continued from page 126

of asphalt varied after the initial compaction, depending on the type of filler. Air void contents of specimens at the same asphalt content also varied, but to a lesser degree, after the initial compaction depending upon the grade of asphalt used. This occurred even though the mixing and initial compaction temperatures were based on constant asphalt viscosities and the volume concentration of the minus No. 200 fractions of the aggregates was constant.

Figure C is a plot of air void content versus the number of compaction gyrations for the three different filler mixes, using 5 percent of 85/100 penetration grade asphalt. Figure D is a similar plot for the same mixes with 40/50 asphalt, Figure E for the 170° F S.F. asphalt. These figures permit comparison of the effects of the fillers on compaction for the different asphalts. They indicate that higher air void contents were present in the mixes containing celite filler than in those containing limestone dust and portland cement, throughout initial compaction and testing compaction for all asphalts. Similarly, the air void contents generally were slightly higher in the limestone dust filler mixes than in the portland cement mixes.

From a design standpoint, on the basis of air void contents in both initial compaction and the testing compaction, it is indicated that the highest asphalt content could be used in the mixes containing the celite filler for all the grades of asphalt. Also that a slightly higher asphalt content could be used in the limestone dust filler mixes than in the portland cement filler mixes for all of the grades of asphalt with the possible exception of the 170° F softening point grade asphalt.

Figure F, G and H permit comparisons of the effects of asphalt consistency on compaction for each filler type. They indicate that air void contents increased as the penetration of the asphalt decreased throughout the initial compaction and the testing compaction for all of the filler types. On the basis of air void contents resulting from both the initial and testing compaction, it is indicated that asphalt contents could be increased slightly as the penetration of the asphalt decreases. The effects of asphalt consistency on compaction were not as

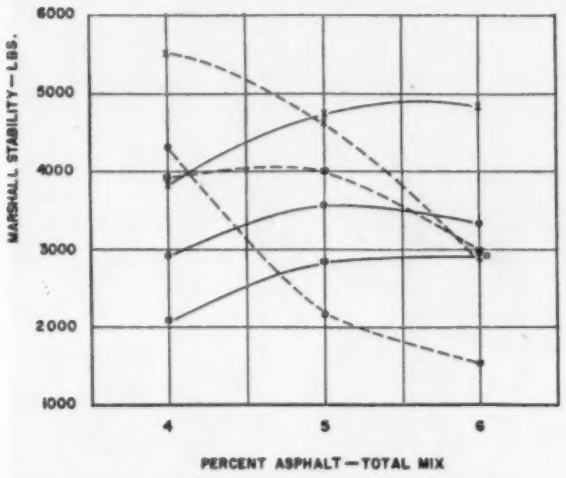


Figure F—Effects of testing compaction on the Marshall stability of Celite filler mixes. Solid line shows initial compaction, broken line shows testing compaction. O shows 85-100 pen. X shows 40-50 pen. Squares show 170 S. P. asphalt for curves F, G and H.

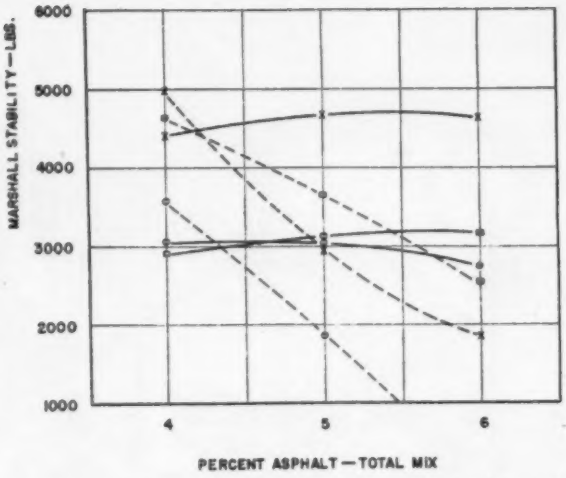


Figure G—Effects of testing compaction on the Marshall stability of limestone dust filler mixes. (See figure F for legend details).

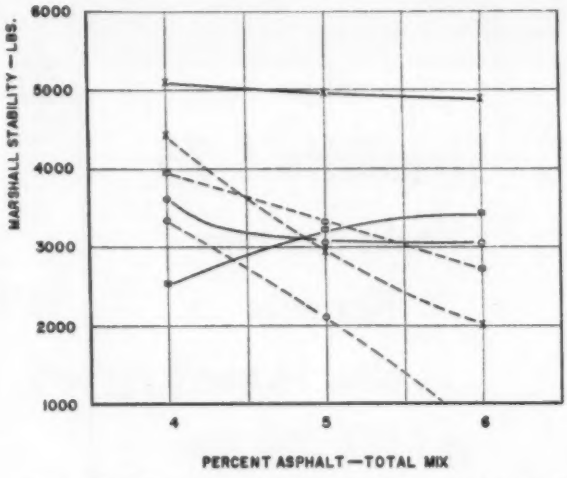


Figure H—Effects of testing compaction on the Marshall stability of mixes containing portland cement filler. (See Figure F for legend details).

pronounced as were the effects of type of mineral fillers for these mixes.

Whether the rate of densification produced by the testing compaction used in this investigation is similar to densification resulting from traffic compaction would have to be established by correlation studies. Michigan Experimental Road test data indicated similar densification trends. Considerable pavement densification occurred during the first 17 months on this test road, and densification progressed at a slower rate up to 52 months. Michigan test road studies indicated that test sections containing the highest viscosity asphalts had the highest pavement air void contents, which is in agreement with the findings of this investigation.

The compactive efforts used in the Institute's laboratory investigations to simulate traffic compaction were much greater than required for highway pavements, but the authors feel that realistic testing compaction conditions could be established with the mechanical gyratory compactor for highway pavements. They also recognize that their procedures represent an accelerated test, and therefore do not take into account any age hardening in the asphalt that may occur in pavements and effect pavement densification.

With the exception of the portland cement filler mixes, stability values increased due to the testing compaction at 140° F for the lower asphalt contents. As asphalt contents increased, stability levels after the testing compaction became lower than at the initial compaction. Stability trends before and after the testing compaction indicate that:

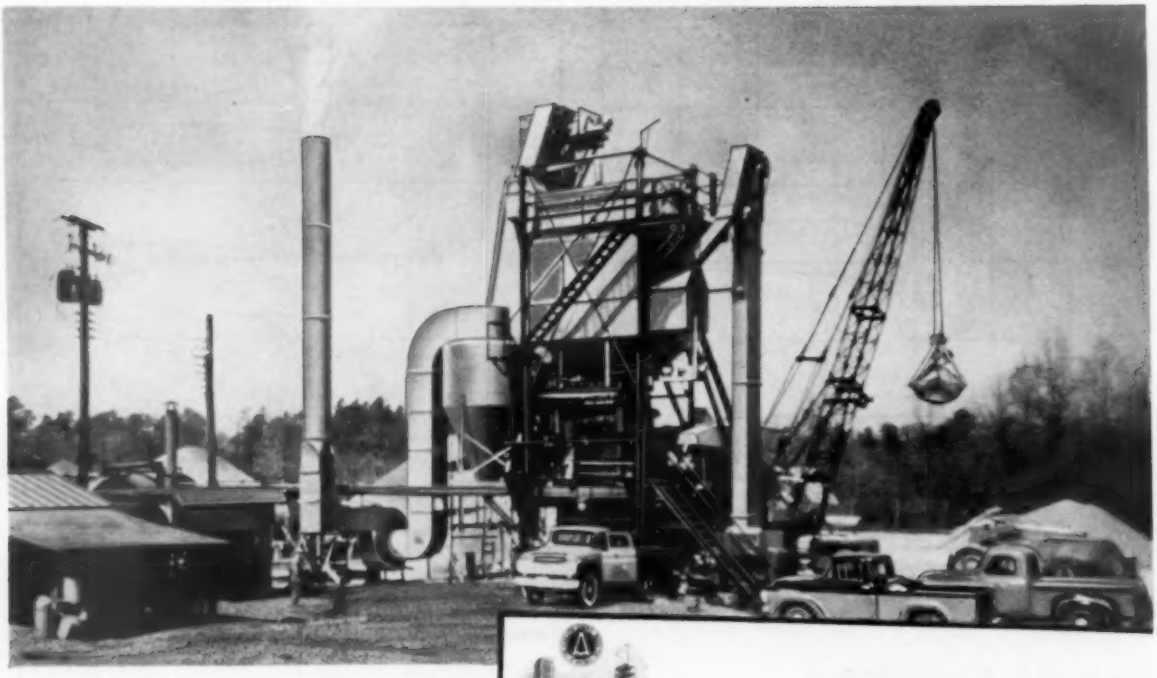
1. Increasing asphalt contents are indicated as the penetration of the asphalt decreased for all types of mineral filler used.

2. Highest asphalt contents for all grades of asphalt are indicated for the mixes containing the celite filler, with the limestone dust filler mixes next in order.

Lowest asphalt contents are indicated for the mixes containing portland cement filler.

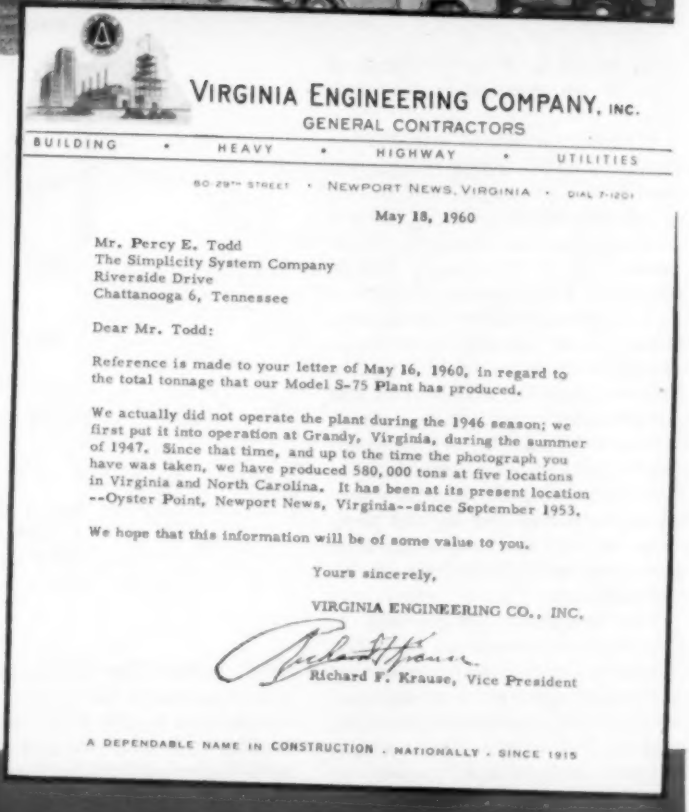
This report also presents graphs showing changes in air void content during initial compaction and testing compaction for the various test mixes containing short asbestos fibre as mineral filler; likewise graphs on Marshall and Hveem sta-

Continued on page 138



This Simplicity S-75 looks and runs like new . . . after 14 years and 580,000 tons

Write us for locations of Simplicity plants convenient to you. See these plants in operation, talk to the men who run them. The information they give is more valuable to you than our "sales talk" or literature. Over the years our satisfied customers have been our best salesmen.



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May 18, 1960

Mr. Percy E. Todd
The Simplicity System Company
Riverside Drive
Chattanooga 6, Tennessee

Dear Mr. Todd:

Reference is made to your letter of May 16, 1960, in regard to the total tonnage that our Model S-75 Plant has produced.

We actually did not operate the plant during the 1946 season; we first put it into operation at Grandy, Virginia, during the summer of 1947. Since that time, and up to the time the photograph you have was taken, we have produced 580,000 tons at five locations in Virginia and North Carolina. It has been at its present location --Oyster Point, Newport News, Virginia--since September 1953.

We hope that this information will be of some value to you.

Yours sincerely,

VIRGINIA ENGINEERING CO., INC.

Richard F. Krause, Vice President

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DEPENDABLE

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A modern, accurately functioning distributor is part of the picture in the Ohio Turnpike's shoulder treatment which is designed for utmost durability.

Pike Shoulders Get Emulsion Seal

Shoulders along the Ohio Turnpike are getting preventive maintenance, planned to fortify them against traffic and weather deterioration. From June through September, 1959, and again this summer, this work has gone on. Last summer a start was made by sealing shoulders on more than 60 miles of the pike's shoulders. Emulsified asphalt and stone chips were applied as here pictured.

Officials of the Ohio Turnpike Commission report that results are excellent to date, and that the program in subsequent years will extend the length of the turnpike.

Shoulders embodying a penetration macadam base flank the turnpike's p.c. concrete lanes. For the shoulder-sealing project, an 8-ft. strip on the inside, and a 10-ft. strip on the outside of each of the dual roadways is sealed with Bitumuls RS-2 (0.3 gal. per sq. yd.) and covered with 20 to 25 lb. of Ohio No. 6 crushed stone or 17 to 22 lb. of slag. Temperature limits of 60 to 120 deg. F are specified for the emulsion at time of application.

This seemingly simple operation is done with painstaking care. The surface to be treated is first thoroughly cleaned of all mud, earth, dust and other foreign material. Where earth or mud of sufficient thickness to retain moisture exists on the surface, it must be removed well in advance of the final cleaning to allow the surface to become thoroughly dry. Any surface-matted bituminous material not definitely bonded to the surface is also removed. Special care is taken to clean the edge of the concrete pavement in order to insure a tight bond between the newly added bituminous material and the edge.

Bituminous material is spread evenly over the surface, by distributor operation. The application rate must not reach a rate that will cause it to flow off the surface.

Stone is spread with conventional equipment, and a drag

Broom dragging is done to insure uniformity of spread of stone cover. (Right): Rolling to imbed chips, plus control of chip quantity, are both considered important to get good embedment and prevent whip-off by passing vehicles.

TYPE 181
Rev. 6/59

SAMPLE

OHIO TURNPIKE MAINTENANCE DEPARTMENT
BITUMINOUS SHOULDER SURFACE TREATMENT
DAILY FIELD REPORT

Date JULY 22, 1959
Temp. Max 85 Min. 70°
Weather CLEAR
Report No. 12

Type and brand of asphalt used RS-2 EMULSION AMERICAN BITUMULS
Type and size of aggregate used LIMESTONE NO. 8
Division WEST
Section KUNKLE
(Instructions: To be completed in duplicate each work day by Crew Chief and submitted to Div. Supt. Forward copy to Maintenance Engineer)

Location				Bituminous Material				Aggregate			
From M. P.	To M. P.	Roadway WB/EB Left/Right	Area of Treatment (Sq. Yds.)	Rate of Application (Gals./Sq. Yd.)	Gals. Mat'l. Used	For Office Use Unit Price	For Office Use Extension	Rate of Application (Lbs./Sq. Yd.)	Tons Mat'l. Used	For Office Use Unit Price	For Office Use Extension
5.0	10.0	WB R	29333	0.3	8800	0.13	1144.00	24	352	2.50	880.00
Totals			29333		8800		1144.00		352		880.00

Labor					Type	Equip No.	Hours	For Office Use Rate	For Office Use Extension
Div. & Section	Name	Hours	For Office Use Rate	For Office Use Extension					
1-1	JONES, S.	8	1.60	12.80	MED. TRUCK	1122	8	2.50	20.00
1-1	SMITH, J.	8	1.60	12.80	" "	1123	8	2.50	20.00
1-1	BROWN, W.	8	1.70	13.60	" "	1124	8	"	20.00
1-1	WHITE, A.	8	1.70	13.60	" "	1125	8	"	20.00
1-1	BLACK, C.	8	1.60	12.80	" "	1126	8	"	20.00
1-1	GREEN, D.	8	1.80	14.40	" "	1126	8	"	20.00
1-2	BAKER, F.	8	2.00	16.00	PICK UP	1111	8	0.70	5.60
1-2	EDWARDS, F.	8	1.80	14.40					
1-2	FINE, G.	8	1.60	12.80					

Costs	
Mat'l Mat'l	$ 1144.00
Aggregate	880.00
Labor	123.20
Sub Total	$ 2147.20
Equip	125.60
Total	$ 2272.80

Rates
Cost per sq. yd. treated $0.077
Sq. Yds. per man hours 407.40

Sample of daily report sheet used in the administrative control over shoulder sealing.

broom is used to smooth out irregularities in the application of stone chips. Seal coat is rolled with tandem rollers.

A small but important detail is the lap specified at pavement edges. The spraybar drops emulsion ½ to 1½ in. over the edge. Care is taken to get chips as well as emulsion well into the joint between shoulder and slab. Cover aggregate is kept off the pavement, or removed by hand scraping where necessary, before it can become embedded in the cured asphalt.

For the initial 60 miles sealed, a total of 471,800 gal. of RS-2 was used.

All work is performed by maintenance forces of the Ohio Turnpike Commission. In each of the 241-mile turnpike's maintenance divisions a division asphalt crew is organized under a crew chief. The chief answers directly to the division superintendent. Certain responsibilities in connection with preparatory work for this program are assigned to the section foreman. The crew chief and section foreman cooperate at all times in the carrying out of the work in each section. A daily field report is completed by the crew chief at the end of each work day and submitted to the division superintendent.

Views And Comments

By H. G. Nevitt

Not Enough Talk

In this day of constant conversation, in person and by other means of communication, along with lengthy manuals on how to operate and maintain practically everything we use, it may seem strange to take the position implied by the title. This would appear to be particularly true when coming from an old-time engineer, brought up in the school that you learned the theory, then went on the job and started doing something in order to really know what it was all about.

However we hasten to remark that our title applies only to the very limited field of *local meetings*, held to discuss the rapidly advancing technology of asphalt paving and other highway construction.

Presumably everyone recognizes the desirability of the big national meetings. They help disseminate knowledge throughout the country. And they serve as a sounding board for discussion, and through their proceedings give individuals a source of current literature. National conferences are particularly important for any field when printed references cannot be issued rapidly as new developments appear.

Unfortunately only a few selected men can and should attend these national meetings. The great majority must wait for the printed proceedings of such affairs; they have no chance to discuss the pros and cons of these new developments unless presented at local meetings.

There are a number of such local meetings each year. We have been fortunate to take in some of them, and we think that local meetings can and should be further improved if the rank and file of those responsible for good highways are to get the full benefit possible from our rapidly advancing knowledge.

There would seem to be three ways to make local meetings more beneficial.

The first is through careful planning, with complete recognition of what such a meeting should best cover for maximum good.

It so happens that the meetings we have attended in recent years—one at the University of Kansas last year and at Iowa State University this year—were very well planned. Some other meetings of this type attended in the past did not deserve this description. There can be a tremendous difference in the quality of the meeting, or amount of information those attending can obtain from it. The mere fact that there is always some benefit, it nothing more than from the exchange of ideas with others after the official sessions, is no justification for insufficient planning.

Second, there should be *more* state or local meetings. For various reasons the meetings should and can be of limited duration. Short meetings can be widely attended with least expense burden and time away from work. However with short meetings the delegates while stimulated in their thinking have less chance to digest and follow through on topics of particular interest.

If practically every man had the opportunity to go to *two* local meetings each year—say in the fall and spring—he would be able to further develop and crystallize the new ideas received. These meetings can be at different places, and for different purposes.

Admittedly, if our thinking in this is sound, it will take considerable effort to get the needed number of meetings organized; and to arrange suitable programs will be far from easy. Leaders must appreciate the need for really good meetings.

Last but not least, we feel that these meetings should be organized to permit—in fact, make mandatory—*more* discussion. In the early days of the low-cost asphalt roads, a great deal of the development and progress came from local meetings. Formal papers were almost a minor part of the affair—though good papers on which to base discussion are a must. The really beneficial part of such get-togethers was the exchange of ideas between the interested and capable men who were leading in the development.

When you could get men such as Donahue of Montana, Bail of New Mexico, Swanson of Colorado and others to discuss the problems in practical fashion, everyone present could not help but gain, and gain far more than from the papers alone. If the papers are organized to discuss "hot" subjects or devoted to local problems, before the debate has ended the delegates are far better indoctrined with the pros and cons than is possible from a large amount of reading, or listening to discussions presenting only one point of view.

Unfortunately this tendency to discuss current problems seems to be much less noticeable today than in the past. It is surely not because the problems are not there—the problems are not as severe as in the past but perhaps more numerous. Delegates today seem to have the idea that floor discussion is poor

Continued on page 137

Route 103 through Warner and Bradford receiving skid-resistant new surface retopping mixture.

New Hampshire Tries Thin Sand-Asphalt Topping

By C. J. Downing,
Construction Engineer, New Hampshire Department of Public Works and Highways

A method of resurfacing called Dix-Seal, trial-tested a year ago on 65 miles of New Hampshire main roads, has proved satisfactory. The method is being used in the rejuvenation of 200 more miles of main arteries this year in a $1,000,000 dollar program.

The mixture was developed and patented by Howard Dickinson, formerly maintenance engineer of the Connecticut state highway department. A closely graded sand and a medium-curing asphalt are mixed in a plant at high temperature, and the resultant mixture spread in a layer of ½ to ⅝ in. thick compacted. The New Hampshire department has experimented in spreading Dix-Seal with road graders, truck-drawn spreader boxes or regular pavers but now uses pavers exclusively.

The sand aggregate, with maximum size under ⅜ in., is a combination of coarse and fine, blended to meet the same grading requirement as the sand portion of a hot-mix pavement. Sand aggregate permits spreading in very thin layers so that city streets could be resurfaced a number of times before curbs would be buried. Quantities of mix per mile, approximately 500 tons for 24-ft. roadway, are low.

New Hampshire specifications call for the following sieve sizes and percentages:

Sieve Size	*Percentage by Weight Passing*
No. 4	85-100
10	65-85
20	40-60
40	20-40
80	8-20
200	3-6

Sand-asphalt hot mixture being spread on historic Londonderry Turnpike in New Hampshire.

Bituminous material ranges 6.5 to 7.5 percent of total mix; sand of cover, 100 percent pass No. 4 sieve.

For this work MC-5 cutback asphalt, the binding agent, is produced in the refinery by mixing about 12 to 14 percent kerosene in a rather soft asphalt with penetration of about 150. The result is particularly viscous, flowing at room temperature.

Success of the Dix-Seal process lies in the elevated temperature of the mix, between 300° and 340°F. At temperature 300°F. some of the kerosene is driven off but much of it that is trapped in the mass of sand makes the mix extremely workable for application. As soon as it is spread on the highway to a thickness of about ⅝ in., the hot kerosene vapors in the upper part of the mix dissipate and a substantially hard crust of asphaltic concrete forms on the surface.

The kerosene trapped in the bottom keeps the lower half of the thickness in a pliable condition and, added to the high heat of the mix, softens the underlying old pavement and creates a tight adhesive bond between the two. It is anticipated that this mixture's low layer pliability will continue several years, healing cracks formed by winter's frost-heaving action, while the top surface hardens and toughens to bear heavy traffic. Newly applied Dix-Seal is extremely black and shiny but the thin surface layer of asphalt quickly wears away leaving a perfect sandpaper finish.

John O. Morton, New Hampshire's Public Works Commissioner, in comparing the merits of the method over the peastone seal that the state has used widely in recent years, reports that the approximate $5,000 per mile cost is the same as for the peastone armour-coating. The new type surface is much quieter to ride on, is skid-resistant, more dips are eliminated, and a far smoother traveling surface is produced. The new mix also has a higher protective quality than peastone, preventing water from reaching the subbase materials. Morton declares that although weather has a critical effect on applying seal coats it has only a minor effect on the mat application. Also, he reveals that during the construction of chip-seal, traffic must travel over sticky asphalt, stone chips scatter over a wide area, and an expert crew is required to obtain a good peastone job but Dix-Seal has considerable more latitude.

Pennsylvania Has Similar MC-5 Mix

Editor's Note: Readers of the foregoing review of New Hampshire's new specification may wish to know of similar mixes used in other states.

Pennsylvania recently issued a specification of this type, issued April 18, 1960, as Tentative Specification, Bituminous Surface, FJ-2. The gradation table specified 90-100 percent passing a ⅜-in. sieve, down to 3-10 percent passing 200.

Actually the New Hampshire patented Dix-Seal is quite similar to the Asphalt Institute's long-standing A-6 Specification for Asphaltic Plant Mix Surface Course, Hot-Laid Graded Aggregate Type (Using Liquid Asphalt Binders). MC-5 is one of the materials used in this specification. The Dix-Seal mix is slightly finer than the Institute's Mix No. II under this specification and the Dix-Seal calls for a higher temperature during mixing, 300-340°F. as against 200-250.

Some readers may question the patent involved, since the Institute's mix design was issued prior to 1947. According to a New Hampshire department spokesman, the patented mix has also been used by the Connecticut state highway department for the past six years. No details were given the Editors as to the technical basis for the patent claim or the amount of the royalty involved.

Rock Asphalt Finds Used in Hot Mix

In Texas, research has pointed to a way to utilizing a waste material that has been piling up by the millions of tons. This is the flour-like fines left from the crushers in producing rock asphalts from the local natural deposits in Uvalde County.

The Texas Transportation Institute, under Professor Robert M. Galloway, undertook an investigation of this material. It consists of a porous limestone rock impregnated with natural asphalt. When used as a component in a blend with other aggregates of marginal quality, asphaltic concrete mixtures were produced showing excellent characteristics for use in roads and streets.

The waste material is reported to be particularly useful in mixes containing rounded, silicious aggregates. Several street and highway projects have been built utilizing asphaltic concrete made with this blend.

This research at the Institute is part of a broad program of finding uses for waste products in Texas. An earlier investigation helped toward the use of slag, which is a by-product of powerhouse combustion at the Texas aluminum smelter. This slag when mixed with fly-ash, also from the same combustion—and sometimes with portland cement, has produced a satisfactory surfacing.

NEVITT

Continued from page 134

form; or they are reluctant to air their possible ignorance. Whatever the cause of this reticence, it keeps men who could contribute a great deal from getting on their feet. This lack of outspoken floor discussion is of course a continuing problem; but it is one that can be overcome by effort on the part of conference organizers.

More and better local meetings, we feel, offer an ideal way in which universities, organizations of specific interests and other groups can utilize their cooperative efforts to the best possible advantage of everyone in the highway profession and industry. Here's to more, and where possible better, local conferences!

ASPHALT GRADE AND FILLER TYPE

Continued from page 129

bility trends.

In their Summary and Conclusions, the authors state that the tests permit comparing the relative effects of asphalt consistency and the various mineral fillers on mix compaction. The procedure developed using a mechanical gyratory compactor for simulating extremely heavy traffic compaction is apparently an effective one. The following conclusions are offered:

1. Appreciably higher asphalt contents can be used in high stability paving mixes containing relatively small amounts of asbestos fiber or diatomaceous filler than for similar mixes using limestone dust or portland cement fillers.

2. Asphalt contents can be increased slightly in high stability paving mixes as the penetration of the asphalt cement decreases.

3. The effect of temperature on densification of asphalt mixes is appreciable. In the design of high stability pavements containing higher than normal asphalt contents, the use of higher viscosity asphalts or small amounts of certain mineral fillers tend to offset the increase in density occurring with increasing compaction temperatures.

The performance and durability of high-viscosity asphalt mixes with higher than normal asphalt content, and mixes containing small amounts of diatomaceous earth or asbestos fiber filler, remain to be proven by field test. The optimum filler contents were not considered in the investigations. It is also possible that other fillers may prove more suitable for maintaining a satisfactory balance between the volume of asphalt and aggregate in paving mixtures for extremely heavy repeated loads and high tire pressures. Other investigations and previous Asphalt Institute studies have indicated that diatomaceous earth fillers would probably have to be incorporated in the asphalt before normal construction plant mixing to minimize or eliminate effects of water on these mixes. Field construction workability and compaction differences may also be encountered.

Based on the results of laboratory tests presented in this paper, it would seem that mixes containing greater quantities of higher viscosity asphalts and small amounts of asbestos fiber or diatomaceous earth fillers could be used to good advantage for field test installations, where higher than normal stability is required for extremely heavy repetitive loading conditions at high temperatures.

The State Roads Commission of Maryland has engaged the consultants, Highway Management Associates of Madison, Wisconsin, to conduct a review of its highway administration practices. John B. Funk, chairman-director of the commission, said the review will encompass all phases of management practices and procedures. The work will be under the direction of W. L. Haas for the consultants.

Although operating at 183 to 250 tph, Dennis' "Batchomatic" plant emits only a fine plume of steam from its wet collector; a welcome sight to both the contractor and air pollution control authorities.

Low Dust Despite Heavy Fines, High Production

In Southern California, where air pollution is a major problem, the V. R. Dennis Construction Co. is able to keep a high-capacity asphalt plant in continuous operation, producing as much as 250 tons per hour. A considerable amount of fine material in the aggregate complicates the problem, but dust emission is held to an extremely low figure—14.8 lb. of dust per hour for every 366,000 lb. of product per hour, for example. According to an independent testing company reporting to the San Diego Department of Public Health, this puts this plant, a Barber-Green "Batchomatic", far below tolerance figures of the air pollution code. This code specification permits a final emission of 40 lb. per hour when the plant is operating at 60,000 lb. *or more* per hour.

The recent tests run on this plant were supervised by K. N. Flocke, Chief of San Diego's Bureau of Industrial Hygiene. The report indicates that good equipment, in proper condition, handled by experienced operators, will easily pass the strict regulations of Southern California's dust control agencies. Although the tests were run on a production basis of 183 tph, dust control efficiency is consistent at the maximum output figure of 250 tph.

Reducing dust emission in asphalt production has other merits, too. According to Superintendent P. G. McFarland, maintenance on this plant is extremely low—due in part to the low dust conditions.

The plant produced about 150,000 tons of paving material in its first 11 months of operation. The plant's entire output is consumed by the many highway and airport contracts that Dennis handles in this area.

Dennis's Barber-Greene "Batchomatic" asphalt plant is equipped with the manufacturer's multi-cyclone dry collector and also with their dual chamber wet collector. The latter unit, of unusual design, draws the dust laden air into the contactor chamber by means of its own fan. This fan, located on the "dry" side of the collector, is free from dust buildup on its blades, a problem which is often the fate of a conventional design which places the fan on the output or "wet" side of the unit. In the contactor chamber, a single nozzle of large diameter provides a solid cone of spray which throughly wets each particle. The water and dust pass through an orifice plate which sets up a violent swirling action as the air stream passes into a separator chamber.

Here the dust is removed from the whirling air by a skimmer blade mounted on one side of the chamber. The water and dust run down this blade and out into a settling tank while the air is discharged out the top of the separator.

The Dennis firm's headquarters and plant are located adjacent to the company's rock and sand deposits.

Foremans' choice! This INTERNATIONAL pickup keeps the job moving by transporting key personnel, critical supplies or what have you to those important locations. Comfortable cab has 5 ft. wide seats, extra head-room. Take your choice of standard all-steel bodies or "Bonus-Load" bodies up to 8½-ft. long. A 266 cu. in. displacement V-8 engine gives outstanding power and gas mileage.

Ideal for servicing equipment and transporting supplies! Hauling loads any place you have to go, INTERNATIONAL stake models increase the speed and efficiency of your operation to cut down on costs. Heavy-duty brakes and springs mean longer life on rough jobs; wide cab seats three men comfortably. True-truck V-8 engines up to 197 hp. are standard to give you outstanding acceleration, constant road speed. Sturdy, economy "sixes" or the new economical INTERNATIONAL D-301 diesel engine are also available. Stake models up to 25,500 lbs. GVW give you a choice of regular or all-wheel-drive – factory installed stake bodies from 8 to 16 ft. long.

Together or individually

THEY BALANCE

These INTERNATIONAL® Trucks are only three examples of the large variety of units that INTERNATIONAL offers the construction field. They can supply an ideal balance to your operation with their speed and maneuverability. Combined with INTERNATIONAL dependability and rugged design, this all results in helping you get the job done right and on time . . . and totals up to bigger profits.

Stop in soon and see your INTERNATIONAL Truck Dealer or Branch for more details on the trucks built to boost your profit picture.

Ready to "hotshot" crews to any hot spot! This rugged INTERNATIONAL all-wheel-drive pickup can step out and over any terrain your construction crews will encounter. Sturdy design and powerful power-line give them the ability to go where others couldn't offer you the same efficiency. Choose from two pickup body types – extra-capacity "Bonus-Load" or standard. They are all-steel from husky sides and ribbed floor to sturdy, sand-tight tailgate. Take your power from standard V-8 or true-truck "six" engines.

YOUR OPERATION

Extra traction where you need it! INTERNATIONAL Trucks with optional Powr-Lok gives your units the traction to get out of those tough places. By transferring extra driving power to the wheel that can get traction, your truck digs in and out without a tow... relieves the worry over your axle snapping.

INTERNATIONAL® TRUCKS WORLD'S MOST COMPLETE LINE

INTERNATIONAL HARVESTER COMPANY, CHICAGO • Motor Trucks • Crawler Tractors • Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors

. . . for more details circle 318 on enclosed return postal card

NEW PRODUCTS

Listed here are reviews of new and improved equipment items, selected to aid our readers in purchasing. See reader service numbers on enclosed postcard.*

All Wheel Drive

All Wheel Drive Bulldozer

A new utility size bulldozer which features either a gasoline or deisel engine in a 49 hp. model was announced by Detroit Tractor.

The new unit is equipped with planetary steering, controlled traction and good visibility. The frame is welded and is reported to give low center of gravity and still maintain a 20 in. clearance. Up and down hydraulics and a blade with inside pusharms is said to give ample power and traction for most jobs.

Detroit Tractor Ltd., 1221 E. Keating Ave., Muskegon, Mich.

For more details circle 101 on Enclosed Return Postal Card.

Tractor-type Crawler

Designed for long distance traveling and greater traction, a new tractor-type crawler developed by Link-Belt Speeder Corp. has been announced.

Designated the LS-78 shovel-crane, the ¾ yd. machine is commonly known as the pipeline lowerer, according to the manufacturer. The tractor-type track belt has full grouser shoes and is equipped with a compensating arrangement that automatically relieves excessive track tension caused by obstacles wedging between the track rail and idler wheel or drive sprocket. The carbody, which is sealed, fully protects all components of the traction and power steer mechanism while traveling through deep water or muck. Similar to a previous model, it offers such features as Speed-O-Matic power hydraulic controls, complete independence of all machine functions, and a split control stand for better below-grade visibility.

Link-Belt Speeder Corp., Cedar Rapids, Mich.

For more details circle 102 on Enclosed Return Postal Card.

Discs

A new motor grader disc attachment designed for shaving and cutting up oiled roads requiring resurfacing, aerating borrow pits or fill, has been announced by the Tower Mfg. Co.

Reported to be quickly and easily attached to any Caterpillar 12 or 14 Motor Grader equipped with hy-

Tractor-type Crawler

*To readers outside of the United States—postal rules forbid use of business reply cards outside of the U.S. Please write to us listing the numbers, month and name of magazine, and mail with your name and address to Inquiry Dept., Roads and Streets, 22 W. Maple St., Chicago 10, Ill., U.S.A.

Shaving and Cutting Discs

draulic power and operating value, it may be rigged without changes on the grader. During periods of inoperation the disc may be left attached while the grader does other work. Made of two gangs of blades, they automatically close into an interlapping position as they are raised. Pre-set angle of the gangs range from 0 to 60 deg. The new unit is offered in two types: the first is a 6½ ft. MGD 22-28 which has twenty two 28 in. discs spaced 6⅛ in. apart; the second, much like the first, is equipped with twelve 12¼ in. spaced blades. Either gang slips interchangeably into the same frame. The manufacturer states that the entire disc assembly can be quickly removed from the motor grader by pulling five pins.

Towner Mfg. Co., Santa Ana, Calif.

For more details circle 103 on Enclosed Return Postal Card.

Locking Fuel Tank Cap

Velvac, Inc., announces the development of a new line of locking fuel tank caps for dump trucks and off the road mobile and stationary equipment. This is a complete line of locking caps, said to fit most of the fuel tanks in use today. Called Velvac series 68L, the caps are available in three sizes, fused and vented, as required by individual types of fuel tanks.

Each tank cap is supplied in a wide choice of key and tumbler arrangements. The keys, special compound tumbler types, cannot be readily duplicated, an extra protective measure, according to the company. The locking mechanism is a key-operated, eccentric, sharp-toothed cam which moves against the inside of the fill pipe so that any attempt to unscrew the cap secures it more tightly in locked position. A tough brass chain and cross-catch prevent cap loss when refueling.

Velvac Tank Cap

Velvac, Inc., 3534 W. Pierce St., Milwaukee 15, Wisc.

For more details circle 104 on Enclosed Return Postal Card.

Electric Drive Equipment

A new line of heavy duty vehicles utilizing four-wheel electric drive was announced by the Peters Co.

The new line of electric drive construction vehicles will include scrapers, bottom and rear dumps, and rubber-tired tractors for pushing and dozing. The electric drive, including generators, controls and motors, will be engineered and manufactured by General Electric. The electric drive eliminates such standard mechanical parts as transmissions, clutch, differential and axles.

Electro Trucks Inc., 1933 S. E. Union Ave., Portland, Ore.

For more details circle 105 on Enclosed Return Postal Card.

Dryers/Dust Collectors

Barber-Greene Company, of Aurora, Illinois, has announced two new rotary aggregate dryers; the Models DA-55 and DA-65, together with portable and stationary cyclone-type dust collectors appropriate to both dryer sizes.

Combinations of various dryer and dust collector components in the company's line of asphalt mixing plant equipment, now provides the maximum possible number of variables to answer all demands in capacity ranges from 30 tph. to well over 200 tph. The Model DA-55 Dryer, with its companion CA-55 portable dust collector or CB-55 stationary collector, serve plants in the 90-125 tph. range, with each collector capable of furnishing exhaust gas capacity in the 18,000 cfm. range. The Model DA-65 Dryer, with either a CA-65 portable or CB-65 stationary

Continued on page 146

Faster, easier dozing...

Faster dozing because you change speed range or direction with a flick of the wrist —no loss of power or momentum—no gear shift guesswork or clutching delay—save productive time on every cycle.

Full-power shift . . . fast-as-a-fox maneuverability

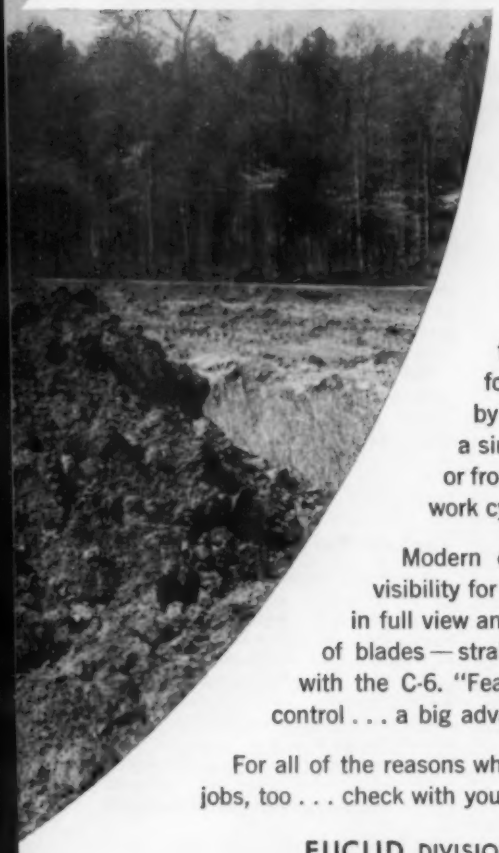
GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

..and overall work-ability

put the "EUC" C-6 in a class by itself!



No matter what your dozing requirements may be—from small grading work for land improvement, plant sites or secondary road construction to the big yardage projects—the new Model C-6 Euclid Crawler offers the best return on your equipment investment.

The C-6 has proved its ability to "doze circles" around other tractors in the 200 h.p. class on job after job. One of the reasons for this outstanding performance is the full-power shift provided by Torqmatic Drive. There's no time lost in clutching and shifting... a simple flick of the wrist changes from one speed range to another, or from forward to reverse and back again. You save seconds on every work cycle . . . keep power matched to the load and job conditions.

Modern design, with rear-mounted radiator, gives the operator better visibility for dozing. The blade is close to the front of the tractor where it is in full view and provides good balance and stability. There is a complete line of blades—straight, angle and "U"—engineered for top dozing performance with the C-6. "Feathered steering" results in smooth turning and positive track control . . . a big advantage on difficult slope work.

For all of the reasons why the C-6 has more work-ability on dozing . . . and other crawler jobs, too . . . check with your Euclid dealer for performance facts and figures.

EUCLID DIVISION OF GENERAL MOTORS • CLEVELAND 17, OHIO

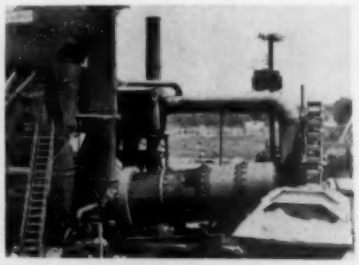
Plants at Cleveland and Hudson, Ohio and Lanarkshire, Scotland

Good balance with heavy dozer attachments... rear-mounted radiator permits close mounting of straight, angle or "U" blade at front and provides excellent visibility for operator. Quick shift permits "rocking" the tractor to get under big boulders, stumps, etc. Power, speed and fast maneuverability, combined with a rugged undercarriage that stands up under heaviest service, make the C-6 a top performer.

Torqmatic Drive...211 net h.p....easy service accessability

New Products

Continued from page 143



Dryer/Dust Collector

collector, serves plants in the 130-220 tph. range. Either collector has an exhaust capacity in the 32,000 cfm. range. Except for size, certain features are common to both dryer models. Both have drums of Man-Ten steel, a non-clogging rotary inlet chute; self adjusting, articulated dust seals; high discharge rotary elevator which discharges material from the dryer in one-quarter revolution; and a top discharge port for exhaust air.

Barber-Greene, 400 N. Highland Ave., Aurora, Ill.

For more details circle 106 on Enclosed Return Postal Card.

Tanker Valve System

A new air-controlled valve system for use on their line of pull tankers, water trucks and water towers has been announced by the Klein Welding Service of Baldwin Park, California. The new valves have finger-tip control from the driver's seat.

The new tanks come equipped with special valves and high capacity 1,000 gallons-per-minute pumps on the standard model; other sizes are optional. Three inch spray heads provide an

Tankers

even disbursement of water over a wide area. KLI pull tankers capacities range in size from 4,000 to 8,000 gallons, tanker trucks carry from 1,000 to 4,000 gallons, and water towers handle from 2,000 to 20,000 gallons. The high capacity Klein tankers are suited for application of water for needed compacting of roads and other uses.

Klein Welding Service, Inc., 14618 E. Arrow Highway, Baldwin Park 19, Calif.

For more details circle 107 on Enclosed Return Postal Card.

Fork Truck

Fork Truck

A fork truck designed especially for heavy lifting work at steel yards, erection sites and similar outdoor operations has been introduced by Clark Equipment Company's Truck Div.

Named the Ranger 700, the truck is 12 ft. high over the cab, 29 ft. long, and 11 ft. wide. The four tires are 74 in. high, and the unit comes equipped with four wheel drive. A feature of the new machine is two sets of operating controls, the second set operable while driving in reverse. Standard equipment consists of power steering, power-shift transmission and four wheel power-assisted hydraulic brakes.

Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.

For more details circle 108 on Enclosed Return Postal Card.

Convertible Transport

Development of a pneumatically-discharging tank-truck transport which can be converted from a hauler of pulverized solids to seasonal use as a fuel oil tanker was announced by Delta Tank Manufacturing Co., Inc.

The convertibility, it has been pointed out, will provide major truckers with a seasonal business balance, permitting them to serve contractors during the construction industry's normally busy spring, summer and early fall months. During cold seasons the highway transports can be converted to serve as tank-trucks for the shipment of fuel oils. Conversion of the unit from a carrier of solids to a hauler of liquids can be accomplished by two men in as little as six hours, the manufacturer states. It is done by changing dome covers and removing pneumatic mats installed along the bottom interior of the transport.

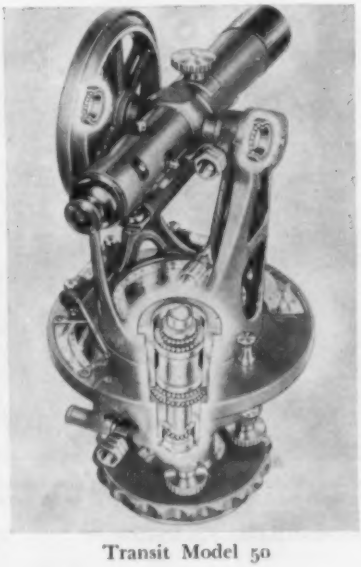
Delta Tank Mfg. Co., Inc., Baton Rouge, La.

For more details circle 109 on Enclosed Return Postal Card.

Convertible Transport

Transit Model 50

A precision Brunson transit, Model 50, featuring securely sealed, permanently lubricated ball bearing construction is being nationally distributed by Charles Bruning Co., Inc.



Transit Model 50

According to the manufacturer, the axes of the transit are completely protected from dust and moisture, bearings in the spindle and telescope axis cannot bind, and permanent, all temperature lubricant will not leak or evaporate. After exposure to a man-made dust storm for 350 consecutive days, the instrument performed as smoothly and accurately as before, states the manufacturer. Glare-free vertical and horizontal circles are engine-divided and has precision cut graduations on sterling silver.

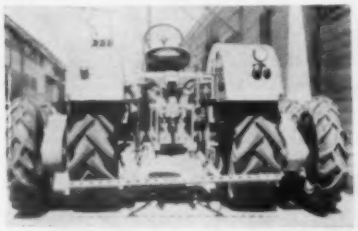
Charles Bruning Co., Inc., Mt. Prospect, Ill.

For more details circle 110 on Enclosed Return Postal Card.

Auxiliary Drive Wheels

An extra set of drive wheels that can be adopted to almost any standard wheel tractor has been announced by Young Iron Works.

Known as the Bogie Power Wheels, the apparatus can be attached outside each tractor drive wheel, and is chain driven from the main axle. The added dimension allows operation on soft ground, across normally impassable ditches and on the side of steep hills.



Auxiliary Drive Wheels

Young Iron Works, 2959 1st Ave., S., Seattle 4, Wash.

For more details circle 111 on Enclosed Return Postal Card.

Glare Proof Blade Control

A new, glare proof, easy–setting dial for their Automatic Blade Control for motor graders is now being produced by Preco Incorporated.

Reflection is eliminated by the use of a black anodized aluminum dial panel. The index of the recessed dial is flush with the calibrated scales, making for easier and more accurate dial setting from any position in the operator's compartment. On superelevated curves, the dial can be gradually moved to the changing slope settings as the grader

Glare-Proof Blade Control

Continued on page 150

This is a 6-foot section of 144" elliptical concrete pipe. It has a greater flow capacity than its equivalent in round pipe and it can be installed in a minimum depth of cut with increased depth of cover. Elliptical pipe saves headroom—allows sufficient cover to reduce frost heave.

Lamar Pipe & Tile Division, American-Marietta Company, Grand Rapids—Pipe Manufacturer *L. W. Edison Company, Grand Rapids, Michigan—Contractor*

USS American Welded Wire Fabric conforms perfectly to the elliptical shape of the 144" pipe. Because of the machine prefabricated accuracy of USS American Welded Wire Fabric, cages can be formed faster, and the spacing and concentricity of cages can be accurately controlled.

strengthen concrete pipe on Michigan Highway job

The Michigan State Highway Engineers faced a problem when it came to the selection of pipe for an important new highway in Berrien County. Hydraulic and grade line considerations dictated pipe with maximum water-carrying capacity with a low flow line, but with up to 33 feet of back fill. They selected over 1,000 linear feet of elliptical, reinforced concrete pipe. Diameters varied from the smallest to the largest—18″ to 144″.* Lamar Pipe & Tile Division, American-Marietta Company, manufactured the pipe.

In the case of the 480 feet of 144″ required to withstand 33 feet of backfill, the specifications required 3 lines of reinforcement—an inner and outer cage each having 0.754 square inches per foot, and an elliptical cage having an area of 1.508 square inches per foot. Lamar Pipe & Tile elected to use American Welded Wire Fabric on this big job.

Concrete pipe manufacturers insist on quality reinforcing, meeting rigid specifications—that's why so many of them use USS American Welded Wire Fabric. This quality product—with its machine-made accuracy, assures the proper distribution of steel because the wire diameters are held to the close tolerance of ±0.003″ and their spacing may not vary by more than ¼″ center-to-center. This prefabricated product is more accurate than other forms of reinforcing. Its cold-drawn, high-tensile steel wires have a minimum yield point of 60,000 psi and a minimum ultimate strength of 75,000 psi. For more information, write to American Steel & Wire, 614 Superior Avenue, N.W., Cleveland 13, Ohio.

*Round equivalent

USS and American are registered trademarks

To increase the strength of the pipe, by resisting diagonal tension, 320 ⅜" diameter stirrups are attached through the three cages of USS American Welded Wire Fabric.

American Steel & Wire Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, Distributors Abroad

. . . for more details circle 358 on enclosed return postal card

New Products

Continued from page 147

travels along. Preco Automatic Blade Controls are available for new or used motor graders. They are available from either Caterpillar Tractor Company or Adams Division of LeTourneau-Westinghouse Company dealers, who also manufacture the motor graders.

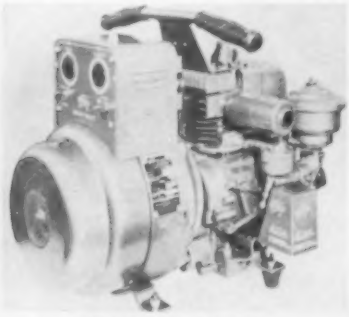
Preco Inc., 6300 E. Slauson Ave., Los Angeles, Calif.

For more details circle 112 on Enclosed Return Postal Card.

Engine Generators

A new generator that is rated at 2500 watts and is designed to power motors up to 1.5 or 2 hp. has been announced by Wincharger Corp.

Titled the Maxi-Watt Power Control, the unit offers power on a single 115 volt or a 230 volt circuit and is said to be typical of many residential and commercial standby uses.



Engine Generators

Equipped with the Automatic Conserver, the idling control, the machine is available in manual, electric or remote start, with a choice of four mountings. The new series 31 is a derivation of the original 4B Winco Engine Generator.

Wincharger Corp., Zenith Radio Corp., East 7th & Division St., Sioux City 2, Iowa.

For more details circle 113 on Enclosed Return Postal Card.

All-Wheel-Drive Trucks

Two new heavy duty international All-Wheel-Drive Trucks have been introduced by the Motor Truck Division of International Harvester Company.

The trucks are the Model R-210 (4x4) rated at 39,000 lbs. gross vehicle weight, and Model RF-210 (6x6) with 49,000 lbs. gvw rating. With optional front axles, gvw ratings of 42,000 and 52,000 pounds, respectively, are available. Front drive axles on both 4x4 and 6x6 models are of a new design that features outrigger type front spring mounting that results in front end stability and a lower chassis height. A larger steering gear has been provided to assure easy manual steering for front axle loads up to 11,000 lbs. For heavier front axle loads, power steering is available.

All-Wheel-Drive

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Ill.

For more details circle 114 on Enclosed Return Postal Card.

Tractor-Shovel

A four-wheel drive loader designated the W-12 has been announced by J. I. Case Co.

The new unit has a carrying capacity of 9000 lbs. and a breakout capacity of 23,500 lbs. The manufacturer states that among the advantages of this machine are: constant mesh transmission that provides speeds of from 0 to 23 mph. in forward and reverse through three speed ranges; power transfer differential for all four drive wheels; power shift, power steer and power brakes. Forward-pivoted lift arms, providing complete operator safety, 9 ft. dump clearance and 1 ft. digging depth, and 360 deg. visibility are also standard. The loader bucket is easily interchangeable with a special designed dozing blade, brush rake and V-type or angling plows.

Tractor-Shovel

J. I. Case Co., Racine, Wis.

For more details circle 115 on Enclosed Return Postal Card.

Crane-Excavator

An improved crane-excavator, designated the 22-B, available as a crawler, carrier or wagon mounted machine, dragline, clamshell, hoe, or shovel service was announced by Bucyrus-Erie.

Some of the new features are the adjustable hook rollers; splined horizontal propel shaft; alloy bronze bearings for propel machinery; splined clutch; and remote control lubrication of swing gear and pinion. Alloy steel booms up to 110 ft. long are available with either bolt or pin connections. Power is provided in a choice of 6x4, 6x6, and 8x4 carriers with gas or diesel power. Full wrap main brakes and three tooth twin spring house lock are also provided.

22-B Crane-Excavator

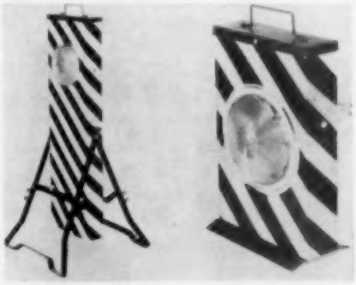
Bucyrus-Erie Co., South Milwaukee, Wis.

For more details circle 116 on Enclosed Return Postal Card.

Portable Flashing Light

Three new models of portable flashing light traffic safety devices have been released by Cripe Tool Mfg. Corp.

Called Safe-T-Blink, the new device incorporates several advantages in design and electrical components, according to the manufacturer. Engineered to serve the needs of contractors and public works departments, the unit operates on transistors. One of the new units comes as part of a barricade, containing two seven in., twin lens flashing units. A second of the units stands 16½ in. high and is designed with a heavy metal base to provide stability. A third unit, which is a larger version of the 16½ in. device, stands 38½ in. high on collapsible legs. This unit measures 10 in. wide and weighs 19½ lbs. All three units are painted in alternated diagonal stripes of black and chrome-yellow.



Portable Flashing Light

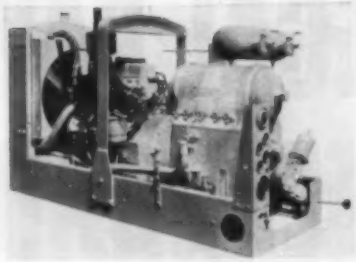
Cripe Tool Mfg. Corp., P. O. Box 61, Owosso, Mich.

For more details circle 117 on Enclosed Return Postal Card.

Rotary Compressor

An improved 125 cfm. rotary compressor, for cross mounting behind cabs on motor trucks, has been announced by Davey Compressor Co.

Designated as Model 125-RP utility skid, it features curbside location of all controls, gauges, service outlets and vertical instrument panel and a fingertip push button electric starter as standard equipment. The clutch, con-



Rotary Compressor

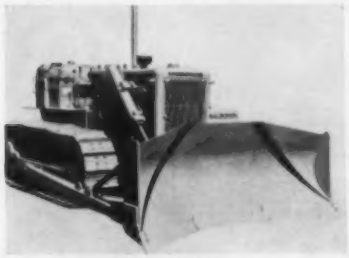
necting the Hercules Go 198A engine to the compressor is of the Twin Disc dry type. It has an extended lever for easy operation from the ground. Other accessories, such as oil filler spout are so arranged that the entire assembly can be serviced without climbing on the truck body. Model 125-RP utility skid dimensions are length, 78 in. height, 48 in.; width, 28 in. Weight is 2190 lbs.

Davey Compressor Co., Kent, Ohio

For more details circle 118 on Enclosed Return Postal Card.

U-Blades

Two new sizes of Balderson U-blades are now available for the new Cat D6B tractor. The regular size, 9 ft. 6 in. is designed and built to do heavy duty work, land clearing and heavy mate-



U-Blades

rial handling. The large blade, the 12 ft., is designed for especially large or heavy work. The Balderson U-blade is interchangeable with Cat straight blades on dozers in the field.

Balderson Inc., Wamego, Kan.

For more details circle 119 on Enclosed Return Postal Card.

Shaker Screen

A new shaker screen that can be used for coal, ores, rubble, crushed stone and other bulk solids has been introduced by Fairmont Machinery Co.

The drive and screen are suspended from wire rope to eliminate the drive arms and provide extra space for screen capacity. According to the manufacturer, when the unit is in operation, reciprocating forces are not transferred to the structure. The drive mechanism is an enclosed self-contained unit with forced lubrication and anti-friction bearings. Desired stroke and speed ranging from ½ in. at 1000 rpm to 5 in. at 165 rpm, which can be adjusted and varied. Power is supplied by a 3 phase induction motor.

Fairmont Machinery Co., Farimont, W. Va.

For more details circle 120 on Enclosed Return Postal Card.

Concrete Bucket

A new concrete bucket that features all-steel, all-welded construction has just been announced by Hetzel.

Equipped with gear controlled double arc clam shell gates with over center self-locking mechanism and adjustable discharge control, the unit will

Concrete Bucket

handle materials ranging from grout to dry mix. Low over-all height gives clearance for operation, according to the manufacturer. The bucket comes in ½, ¾ and 1 cub. yd. sizes and is 4 ft. 4 in. over all, including the bail.

Hetzel Steel Form and Iron Co., Warren, Ohio

For more details circle 121 on Enclosed Return Postal Card.

3 axle Low-Bed

A 3-axle heavy duty low-bed trailer said to include new performance features is announced by LaCrosse Trailer Corporation. Single point suspension design assures equal load distribution on each axle, regardless of where the load is placed on the trailer bed, according to the maker. All three models, the 30 ton, 40 ton and 50 ton, are available with either 15-in. wheels or the 20-in size for long haul service.

The new 3-axle design incorporates a thru-axle tandem assembly coupled to the third axle by a walking beam. This walking beam, constructed of T-1 steel, provides the connection between the single forward axle and the rear tandem assembly with single point suspension from the trailer frame. Two-way oscillation provides uniform distribution of weight even when single wheels are raised or lowered by uneven ground. Positive alignment of the entire 3-axle unit is claimed by means of an independent stabilizer bar attached to the forward or third axle. High pressure oilite and rubber bushings are used throughout the assembly to insure the longest possible life and alignment.

LaCrosse 3-axle Low-bed Trailer

LaCrosse Trailer Corporation, 418 Gould Street, Box 857, LaCrosse, Wisc.

For more details circle 122 on Enclosed Return Postal Card.

Hammer Output Gauge

A device that will allow users to rate the output of Link-Belt diesel pile hammers has recently been announced.

Due to the enclosed cylinder head of the Link-Belt pile hammers, the device was necessary to determine the output. The new device operates by means of a direct hose connection with the compression tank. The gauge records the equivalent WH rating in ft. lbs. by combining the actual ram stroke, plus

Hammer Output Gauge

the extra "air spring" energy in the upper part of the cylinder. The complete instrument consists of a pressure gauge, push button valve, piping and air hose connection; which are all enclosed in a compact carrying case with a graph-type equivalent energy chart and instructions.

Link-Belt Speeder Corp., Cedar Rapids, Iowa

For more details circle 123 on Enclosed Return Postal Card.

Drop Deck Trailers

A new trailer by Talbert Trailers, Inc., features a weight reduction of 5,000 lbs.

Using a new metal, USS "T-1" high strength steel, the trailers will be three times stronger, as well as lighter, according to the manufacturer. A removable gooseneck powered by twin hydraulic rams uses the entire bearing area of tractor tandem to raise and

Continued on page 156

NOW! INCREASE LEGAL PAY WITH ALL-STEEL GAR

This contractor's trailer for tandem-axle tractors holds 20 cubic yards. Other models and sizes available for single axle tractors. Can be equipped with variety of discharge gates for any application.

Seven Types of Discharge Gates Meet All Contractor Hauling Needs

A complete line of Gar Wood discharge gates tailor Mono-Shell hoppers to your exact job requirements. Each is designed for easy, positive operation, yet is ruggedly built to take the rough abuse of day-in, day-out service.

Air-powered clamshell gate lets operator accurately windrow fill, aggregate or sand. Big twin cylinders close against the load. Optional cab-operated controls are widely used for fast, on-the-go dumping.

Cable-operated door-type gate is ideal for pit-dumping, plant-to-plant use and long-haul operations. Available with optional air trip or air rewind.

Manually-operated gate is ideal for pit-dumping or windrowing. Low in weight ... easily operated.

Transverse spreader gate is air-powered so that heavy, coarse materials like chips and gravel can be laid-down in eight-foot wide layers, to specified depths.

For specialized applications, Gar Wood has engineered rack-and-pinion models, as well as patented butterfly and split-butterfly gates.

Enclosed Hopper Provides Complete Weather Protection for Free-Flowing Materials

Bulk handling of any free-flowing material is a growing trend around the country. That's because it's faster, less costly and there's no chance of damage or loss from spillage or contamination.

With bulk hopper delivering you eliminate the time and cost of handling packaged materials through the many steps from source to end use. Hopper trailers let you load, haul and unload in record time ... let you schedule more trips per day and bigger payloads per trip.

The models shown above can be equipped with either permanent or removable aluminum domes. Loading hatches are fitted with vented, self-locking covers which allow free "breathing" yet keep water out. And with Gar Wood's patented butterfly gates, the load is completely protected from dirt, water and all weather conditions. These gates are engineered for fast, safe, fool-proof operation.

Enclosed Gar Wood Mono-Shell hoppers are also available as semi-trailer units and can be equipped with one, two, or three discharge gates. Semi-trailer models are compartmented both for fast, positive cleanout and for hauling different materials on the same trip without contamination.

Wide Variety of Bodies are Customized for Your State, Application

For half a century Gar Wood has been the country's leading builder of quality truck equipment. This experience is reflected in Mono-Shell hopper trailer design and versatility.

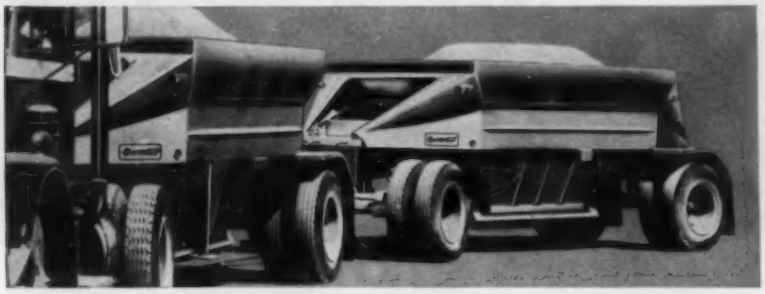
With standard body models, Gar Wood can customize a hopper trailer to your exact job requirements, and, just as important, to your state road-weight restrictions. You get maximum *legal* payloads for every application, with minimum maintenance and operating costs.

LOADS 23% OR MORE* WOOD HOPPER TRAILERS

New Hauling Method Drastically Reduces Operating and Maintenance Costs

WAYNE, MICHIGAN—Gar Wood Industries, world's pioneer truck equipment firm, announces a revolutionary new bulk material hauling method for contractors and contract truckers. Proved for the past eight years, in widely diversified applications throughout the West, the method utilizes hopper trailers designed and built by Gar Wood.

Immediate and most important advantage of the hopper trailer method is the fact that far greater payloads can now be hauled over the nation's roads and highways. Compared to conventional truck-mounted equipment, Mono-Shell hopper trailers let you increase legal payloads 23% or more per trip...even two or three tons more than other trailer methods. Examples of these extra payloads include 28½ tons in Ohio with Gar Wood double-train hopper trailers, and 26 tons in Florida with semi-trailer units.



Payload increases like these result from Gar Wood's exclusive Mono-Shell design which reduces tare weight, and from trailer design and mounting techniques that let Gar Wood distribute more weight over a much greater axle span. Thus, for the first time a manufacturer with nation-wide sales and service facilities is able to offer standard equipment that can be assembled to meet widely varying state axle-weight laws.

The Gar Wood hopper trailer method offers exceptional benefits to construction, sand and gravel, cement and other industries where bulk hauling is utilized. Increased payloads mean increased profits, and will provide an effective solution to the current cost-profit squeeze. Reduced cycle time and more trips per shift will result from faster loading and discharge operations.

The unique structural design of Gar Wood Mono-Shell units greatly reduces maintenance and repair costs while letting each truck or tractor rig haul more payload per original equipment dollar invested.

Proof of the many money-saving advantages made possible by Gar Wood's hopper trailer method is available through a payload analysis offered by local Gar Wood Truck Equipment Distributors.

*CHECK THE "HOPPER HAULING" PAYLOAD FOR YOUR STATE

WITH DOUBLE-TRAIN HOPPER TRAILERS

State	G-W Hopper Legal Load
Arizona	28 Tons
California	28 Tons
Idaho	28½ Tons
Michigan	**
Nevada	28 Tons
New Mexico	32 Tons
Ohio	28½ Tons
Oregon	27 Tons
Utah	29 Tons
Washington	26 Tons

WITH SEMI-TRAILER AND TANDEM AXLE TRACTOR

State	G-W Hopper Legal Load
Colorado	26 Tons
Illinois	24 Tons
Indiana	24 Tons
Iowa	24½ Tons
Kansas	21 Tons
Louisiana	**
Minnesota	24 Tons
Missouri	21½ Tons
Montana	24½ Tons
Nebraska	24½ Tons
North Dakota	24½ Tons
Oklahoma	24½ Tons
South Dakota	24½ Tons
Texas	24 Tons
Wisconsin	24½ Tons
Wyoming	25 Tons

WITH SEMI-TRAILER AND SINGLE-AXLE TRACTOR

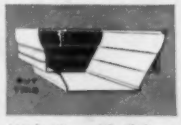
State	G-W Hopper Legal Load
Alabama	21½ Tons
Arkansas	21 Tons
Connecticut	21 Tons
Delaware	21 Tons
Florida	26 Tons
Georgia	22½ Tons
Kentucky	21½ Tons
Maine	21 Tons
Maryland	23 Tons
Massachusetts	21 Tons
Mississippi	20 Tons
New Hampshire	24 Tons
New Jersey	22 Tons
New York	23 Tons
North Carolina	23 Tons
Pennsylvania	21 Tons
Rhode Island	21 Tons
South Carolina	21 Tons
Tennessee	20 Tons
Vermont	21 Tons
Virginia	19½ Tons
West Virginia	20 Tons

**Legal payloads in this state increase in direct ratio to reduction in equipment weight. Mono-Shell hoppers have lowest possible tare weight.

The above figures are based on data provided by the National Highway Users Conference, March, 1960, and are computed with standard heavy-duty tractors.

Mono-Shell Design Eliminates Dead Weight

Conventional design has heavy frame and cross braces that obstruct loading. Shell must still be added to this complex frame, increasing weight.



With Mono-Shell hopper design the contours of the body shell itself form all the required strength and support for a stronger, yet lighter body.

GAR WOOD INDUSTRIES, INC.

Wayne, Michigan • Richmond, California

. . . for more details circle 304 on enclosed return postal card

CF&I CUTTING EDGES

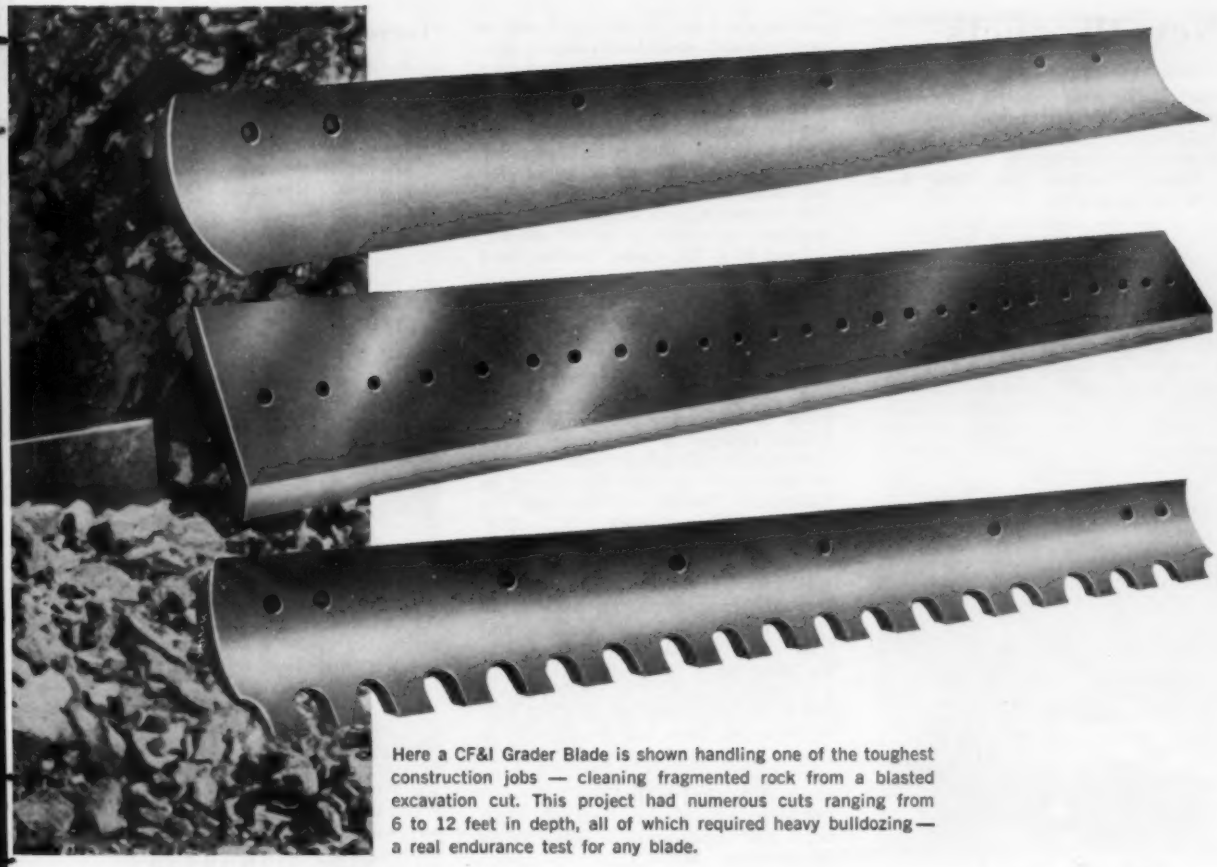
proved superior by comparison in rugged country

■ A valuable piece of earthmoving equipment and a top-notch operator represent a considerable investment . . . but they won't give you a satisfactory return on your investment if the cutting edge on the moldboard fails to do its job. That's one of the reasons why construction and maintenance men who have compared *quality,* specify CF&I Grader Blades and Cutting Edges.

Here's an example given by a large user of cutting edges in rugged country where costs and equipment downtime really count. Over 1600 miles of road must constantly be maintained and rebuilt in one of the largest counties* in the Pacific Northwest. In their year-round battle with the elements, the highway department faces the extremes of low valley roads and high mountain passes . . . plus the problems of torrential rains that cut deep gullies, and blizzards that bury almost half of their roads under frozen drifts. They must be prepared to handle the thick muck in the river valley as well as the scab rock, boulders and lava at the higher elevations. In this rugged county the tools of maintenance are vital!

For the past twelve years, the department has

*Additional information on request.



Here a CF&I Grader Blade is shown handling one of the toughest construction jobs — cleaning fragmented rock from a blasted excavation cut. This project had numerous cuts ranging from 6 to 12 feet in depth, all of which required heavy bulldozing — a real endurance test for any blade.

experimented with nearly every blade on the market. At times, competing blades have been mounted side by side with CF&I blades on various types of equipment and tested against all kinds of conditions. They found that purchasing inferior blades is costly because the ends chipped and brittle edges broke in small half circles and wore rapidly. As a result THEIR FIRST CHOICE IN CUTTING EDGES IS CF&I.

CF&I Cutting Edges are scientifically designed and carefully manufactured to give long, trouble-free service. They are made of special-analysis, new billet, open hearth steel, to assure high abrasion and fatigue resistance. They are cold drilled and punched to preserve the original properties of the steel, with no hard or soft spots.

Whatever your requirements may be, CF&I maintains nation-wide inventories of all kinds of blades through more than 700 distributors. For complete details contact one of them or your nearest CF&I sales office.

CF&I products for the construction industry:

Cal-Tie Wire • Cutting Edges • Fence (Chain Link and Right-of-Way) • Galvanized Steel Strand • Grinding Rods • Grizzly Bars • Merchant Bars and Shapes • Nails and Staples • Plate Parts • Prestressed Concrete Strand and Wire • Rebars • Rock Bolts and Metallic Fabric • Screen Bars • Structural Shapes • Stucco Netting • Vibrating Screens • Welded Steel Pipe • Welded Wire Fabric • Wire Rods • Wire Rope

For complete information on all products, ask for Catalog G-104, "CF&I Steel Products for the Construction Industry."

CF&I STEEL

CUTTING EDGES

THE COLORADO FUEL AND IRON CORPORATION

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso Farmington (N. M.) • Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Wichita

In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Phila.

. . . for more details circle 291 on enclosed return postal card

New Products

Continued from page 151

lower deck. Also featured are: removable three axle suspension; removable third axle; Hendrickson rubber bushed tandem; and outriggers.

Talbert Trailers, Inc., 7950 West 47th St., Lyons, Ill.

For more details circle 124 on Enclosed Return Postal Card.

Corrugated Truck Body

The KW-Dart Truck Company offers a new weight-saving corrugated body on its model 35SL. The material used in the body of this off-highway hauler is strengthened by a corrugation process which is said to provide added rigidity and durability.

The use of a corrugated body reduces the truck's weight by more than

Corrugated Truck Body

4000 pounds and increasing its capacity from 35 to over 37 tons, according to the manufacturer. This weight reduction also permits faster dead-heading and offers greater fuel economy. Equipped with a 450 horsepower diesel engine the model features a three-speed transmission and three-stage torque converter with downhill braking feature.

KW-Dart Truck Co., Kansas 41, Mo.

For more details circle 125 on Enclosed Return Postal Card.

Charging Hopper and Feeder

A new Cedar Rapids Charging Hopper and Feeder Unit, designed for use with portable or stationary asphalt plants, has been announced by the Iowa Mfg. Co.

Charging Hopper & Feeder Unit

Designated the Model 405, it will be available with or without running gear. The Base unit can be converted to a charging and feeder hopper by adding 2 ft. high extensions and thus increasing the capacity 5 cu. yd. to 10 cu. yd., with a 40 yd. total struck capacity. Either unit may be driven by an electric motor or combination gas engine. The hopper may be set at any operating position within an arc of 180 deg.

Iowa Mfg. Co., Cedar Rapids, Iowa

For more details cricle 126 on Enclosed Return Postal Card.

Push Block

A one-piece tandem ripping push block that transmits force of the push tractor directly to the ripper shank and thereby minimizes bending forces on the shank has been announced by Caterpillar Tractor Co. for both the No. 8 and No. 9 Rippers.

The push block is mounted on the rear of the five position clevis equipped with a straight shank. It requires neither welding nor cutting for installation. In operation, the blade of the second tractor is placed in the "V" formed at the junction of the vertical block and a horizontal plate. The block extends below the plate and contacts the rear of the ripper shank at a point nearly at ground level. By keeping the point of contact so low to the ground and by eliminating the transmission of pushing force through the clevis, pins and beam, the ripper shank is subjected to less bending force.

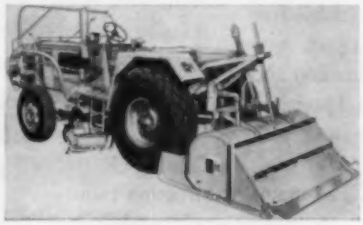
Caterpillar, Peoria, Ill.

For more details circle 127 on Enclosed Return Postal Card.

Rotary Mixers

Major improvements have been announced on the Pulvi-Mixer and Trav-L-Plant line of rotary mixers manufactured by American-Marietta.

The most immediately recognizable change is the modern appearance of the equipment with low squared-off hood and fenders. According to the manufacturer, this has improved acces-



A-M Trav-L-Plant

sibility to all parts of the engine and drive system. Power steering and rotor transmission have also been improved, together with better traction and floatation, states A-M.

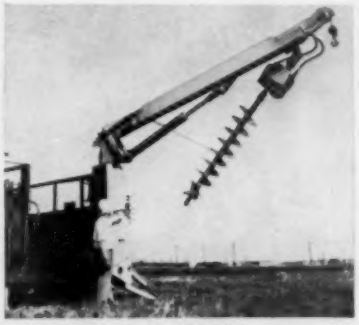
American-Marietta Co., Construction Equip. Div., Milwaukee 1, Wis.

For more details circle 128 on Enclosed Return Postal Card.

Turret Derrick

A completely new universal turret derrick unit with full 360 deg. rotation, three mounting positions and fibreglass one-man basket is now in production at Truco/Denver.

Known as the Model 8-TTD-30-U, the Truco Universal Derrick will



Turret Derrick

mount at right, rear, left rear or behind the cab in only 16 in. of space. All controls are unitized into the base, giving the operator full visibility and fast response of controls from one location. The box type heavy duty steel booms telescope in two sections to give a 21½ ft. extended working radius through 360 deg. arc range. An engineering feature is in the versatility of the hydraulic digger unit that the operator may stow and unstow automatically, using the digger with either boom section. The derrick has a 30 ft. sheave height.

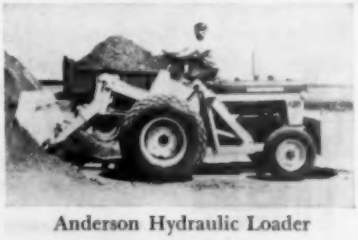
Truco/Denver, 3963 Walnut St., Denver 5, Colorado

For more details circle 129 on Enclosed Return Postal Card.

Hydraulic Loader

A new loader that scoops with hydraulics has been announced by A. C. Anderson, Inc. for mounting on International 340 and 460 tractors. Instead of ramming with the tractor, the bucket is pushed into the pile by heavy duty hydraulic cylinders while the tractor remains stationary. This exclusive "Power-Crowd" feature is said to eliminate needless wear and tear on the tractor and especially clutch wear caused by loaders that depend on tractor traction and engine power.

Positive bucket filling to full ¾-yard capacity is claimed for the hydraulic action. The loaded bucket can be brought close to the tractor or carried at any desired height. The unit's con-



Anderson Hydraulic Loader

struction makes it possible to bring the tractor close to a truck, using the large tires as bumpers, while full bucket control allows self-cleaning dump action.

A. C. Anderson, Inc., Dept. 264, Wildwood, N. J.

For more details circle 130 on Enclosed Return Postal Card.

Asphalt Plants

White Manufacturing Company announces the addition of two new low cost asphalt plants to their present line. The Models L-301B and L-501 are similar in design and are rated at 1500 and 2000 lb. per batch respectively. Both plants are designed to supply hot mix asphalt for general paving work as well as city and county street maintenance at the rate of 30 to 50 tons per hour. They feature air-operated controls with air supplied from a built-in compressor, extra large storage bin, extra large dryer for more capacity with wet materials, bigger burner and blower combinations. Accessories available are aggregate and asphalt scales, dust collector and exhauster, asphalt pump and meter.

New White Asphalt Plant

White Manufacturing Company, Elkhart, Ind.

For more details circle 131 on Enclosed Return Postal Card.

Wheel Tractor

The latest addition to the growing line of wheel tractors is the new 57 hp. Model W-3 J. I. Case.

Designed for use as a 2500 lb. capacity loader and 3000 lb. capacity backhoe, it can also be used with a wide choice of interchangeable equipment, including crane boom, dozer, all-purpose blade, scarifier-scraper and post hole digger. The new backhoe digs to a depth of 14 ft. and reaches 20 ft. from the front axle. It features a foot operated 180 deg. swing and double-acting swing cylinders that allow swinging boom at full speed with a cushioning effect at the end of the stroke. Some features include torque-converter drive, synchronized shuttle transmission, power-steering and a 7000 lb. capacity front axle.

J. I. Case Co., Racine, Wis.

For more details circle 132 on Enclosed Return Postal Card.

Shallow-Contoured Buckets

A line of shallow-contoured buckets, suitable for ditch-cleaning is now offered by Hydraulic Machinery Co.

Available in widths up to five ft., the buckets can be used on either the Hy-Hoe 380 backhoe or the smaller 250 model. The manufacturer states that the bucket can be reversed in 10 minutes to adapt to shovel-operation or stockpile operations. Struck capacity of the five ft. width model is 13 cu. ft. Other suggested applications include topsoil stripping, loading ripped blacktop and backfill.

Shallow-Contoured Buckets.

Hydraulic Machinery Co., Waukesha, Wis.

For more details circle 133 on Enclosed Return Postal Card.

New Products

Steel Tool Drawer

Bay Products, Inc., announces a simple and inexpensive all-steel drawer for the storage of tools and equipment at workbenches and machine stations. It is equipped with a backstop to prevent accidental dropping and a hasp which can be padlocked to prevent unauthorized "borrowing." Finish in

Bay Products Tool Drawer

gray baked enamel, it is supplied with hardware and instructions for mounting under any wood top bench or table or under any steel tray whose flanges turn up. It is available in either 13 x 15 x 5-in. or 16 x 16 x 5-in. sizes.

Bay Products Inc., 1801 W. Cambria Street, Philadelphia 32, Pa.

For more details circle 134 on Enclosed Return Postal Card.

Portable Conveyors

A new, long-reach series of portable belt conveyors, available in 18, 24, 30 and 36-in. belt widths and in lengths of 69, 75 and 81 ft. has just been announced by Barber-Greene Company. The new conveyor series is identified as the PA-80 Series.

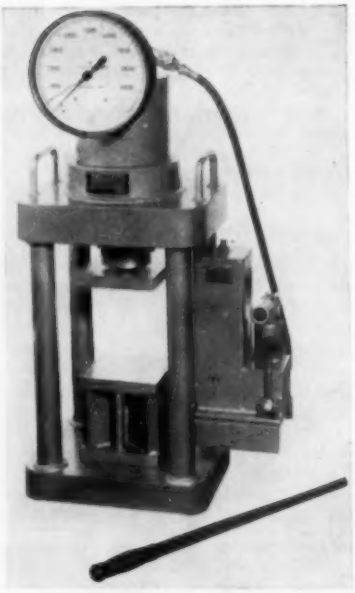
Hourly capacities of the new series range from 155 to 630 tph, depending upon belt width. Among the many structural features of the conveyors are: ball bearing troughing carriers and return rollers, with permanently lubricated "Permagreased" idlers as an option; a super-heavy duty "V" truck equipped with pneumatic tires and swivel wheel mounts, permitting use of the conveyors in radial stockpiling applications; "V" belt drive from electric motor power unit to head-end mounted torque-arm drive; hydraulic boom hoist with full power-operated hydraulic hoist as an option; anti-friction foot-end complete with metal skirt boards for non-spill loading; and optional ring-type towing hitch.

Barber-Greene Company, Aurora, Ill.

For more details circle 135 on Enclosed Return Postal Card.

Concrete Tester

Aportable concrete tester designed to perform compressive strength tests on six in. dia. cylinders or cubes has been announced by Soiltest Inc.



Concrete Tester

The new device is factory calibrated and is said to be accurate to within 1% of indicated load. Approximately 38 in. high, 21 in. wide and 20½ in. deep, it weighs 480 lbs. Available as an accessory is an electrically driven hydraulic pump. Concrete specimen are placed and centered on the lower platen and the upper platen assembly is brought into contact with the upper surface of the test cylinder or cube. Load is then applied at a constant rate of between 25 and 50 lbs per sq. in. per second until the specimen fails.

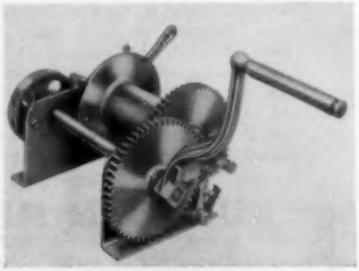
Soiltest, Inc., 4711 W. North Ave., Chicago 39, Ill.

For more details circle 136 on Enclosed Return Postal Card.

Portable Hoist

A portable two ton hoist for use on cranes, booms, derricks, material elevators and general building equipment has been announced by the Sasgen Derrick Co.

Mounting in any position and with a single line, it will handle a 4,000 lb. load and with a double line capacity the load is rated at 8,000 lb. The brake is a double acting, external band type and is used for lowering ordinary loads.



Portable Hoist

A spring loaded ratchet pawl will hold a load at any point when pressure on the crank is released. Overall construction includes steel machine cut gears, drum and frame.

Sasgen Derrick Co., Dept., WO-10, 3101 West Grand Ave., Chicago, Ill.

For more details circle 137 on Enclosed Return Postal Card.

Two-Way Radio

A new 100 watt vehicular communications unit has been announced by General Electric Communication Products Department.

Available in low band frequencies

Two-Way Transistor Radio

of 25 to 50 mc. it comes in a case four in. high, 8⅝ in. wide and 15 in. long, allowing under the dash board mounting. It is designed in two sections to facilitate mounting in trucks, under seats or various other parts of the vehicle. It will draw only 1.75 amperes when "on" and ready to transmit.

G-E Communications Products Dept., P.O. Box 4197, Lynchburg, Va.

For more details circle 138 on Enclosed Return Postal Card.

Torque Steering Booster

A torque steering booster to fit Adams motor graders, models No. 312, 414, 512 and 550, and Allis-Chalmers motor graders, models AD-3 and AD-4, is now being manufactured by Rivinius, Inc., and is available only through Caterpillar distributors. Rivinius manufactures the same torque steering

Steering Boosters for Motor Graders

booster to fit any Caterpillar motor grader.

The company stated that the device, by adding to power control, reduces operator fatigue and maintains efficiency. It adds that, with the steering booster, wheels turn with ease, whether the machine is moving or not, and graders are kept from drifting, even on inclines.

Rivinius, Inc., Eureka, Ill.

For more details circle 139 on Enclosed Return Postal Card.

Truck Bodies

Following consumer suggestions, McCabe-Powers Body Co. has improved exterior lines and compartment space and has announced the production of the 1960 models.

Standard equipment on the body includes binding nylon door hinge bushings, fully-enclosed steel wheelhousings and adjustable shelves and parts bin with hinged cover and removable bin dividers.

Bodies are available in sizes for old

McCabe-Powers Aerial Ladder

or new ½, ¾, 1 and 1½ ton chassis. An aerial ladder, available in two models and in 26 ft. and 30 ft. lengths, can be furnished with the body.

The model ML ladder is elevated by a manual hydraulic pump and the model LH by a motor-driven pump powered by the truck battery. Both models rotate 360 deg. and extend to desired length manually.

McCabe-Powers Body Co., 5900 N. Broadway, St. Louis 15, Mo.

For more details circle 140 on Enclosed Return Postal Card.

Oxygen-Saver

A new oxygen-saver for flame cutting equipment was recently revealed by the Harris Calorific Co.

The manufacturer states that the new device, No. 33 duo-control for single torch, permits the use of high heat flame for instant start. When actuating the pre-heat oxygen control lever, the flame needed to support continuing cutting action is reduced to a minimum.

Oxygen-Saver

New Products

The device is said to cause less hardening of surface cut, leave no rounding of kerf edge, and slag is eliminated, resulting in cleaner cuts and less cleaning time.

Harris Calorific Co., 5501 Cass Ave., Cleveland 2, Ohio

For more details circle 141 on Enclosed Return Postal Card.

Detachable Speaker

A new detachable speaker that may be hung on the car or truck window so messages may be heard by a driver who is outside the vehicle has been announced by General Electric.

Weighing only three lbs., eight oz.

Detachable Speaker

the 10 watt design requires only .090 amp. on "stand by" and is used with a transistorized radio. It may be useful where prevailing noise conditions over-ride the standard speaker's output.

General Electric, Communications Dept., Lynchburg, Va.

For more details circle 142 on Enclosed Return Postal Card.

Pile Hammers

Two new pile hammers have been announced by the McKiernan-Terry Corp.

The new models, designated as C-3 and C-8, follow the design of a patented operating cycle which allows a high rate of energy output at a low steam or air consumption. Featured in the units are self-seating valves that eliminate the need for additional air or steam as the hammer ages according to the manufacturer. The 8,500 lb. C-3, delivering 130-140 blows per minute, work with either a 500 or 600 ft. air compressor or a steam generator. The C-8 operates with a 900 ft. air compressor or a steam generator. A safety feature is the over-travel, designed to prevent damage to the one-piece ram and hammer parts if the pile breaks or it suddenly drives through soft strata and the anvil block is left unsupported.

McKiernan-Terry Corp., Dover, New Jersey

For more details circle 143 on Enclosed Return Postal Card.

Tire Inflation Device

A new performance feature for subgrade, base and asphalt compaction units has been released from Bros, Inc.

An "on the run" tire inflation device is offered for new rollers as well as a modification kit for all SP-730 rollers now in the field. It allows the roll-

Tire Inflation Device

er operator to increase and decrease tire pressures quickly during rolling operations. The inflation kit includes compressor, gauge, control stand, air seals, air line and protection covers to each tire.

Bros Inc., Road Machinery Div., 1057 Tenth Ave. S.E., Minneapolis 14, Minn.

For more details circle 144 on Enclosed Return Postal Card.

Anchor Bolt Cement

A new pourable cement for setting anchor bolts has been announced by National Asphalt Corp.

Offered under the trade name "Nacor Anchor Bolt Cement", it comes in powdered form. When mixed with water it becomes semi-fluid to make pouring or troweling possible. The manufacturer states that anchor bolts, in the new cement, can be drawn tight and ordinary stationary equipment put into operation within 30 minutes. Vibrating machinery may require a longer drying period. It could also be used for emergency repair of shallow holes in concrete floors, according to the producer.

National Asphalt Corp., Brooklyn Station, Cleveland 9, Ohio

For more details circle 145 on Enclosed Return Postal Card.

Hoe Attachment

A hoe attachment which will allow the operator to select the best boom length, giving 13 ft. of variation on a ¾ yd, hoe has been reported by the Burg Mfg. Co.

The manufacturer's specifications indicate that the variable length boom feature allows a ¾ yd. machine to dig 10 ft. of level base at 20 ft. depth with a maximum digging depth of 23 ft. Other advantages claimed for the machine are that line and grade can be better maintained; footings can be more accurately dug with the same machine; and trenching in restricted areas and around service lines is facili-

Hoe Attachment

tated. A ten minute color movie showing the Super Hoe in action is also available from the manufacturer.

Burg Mfg. Co., Waverly, Nebraska

For more details circle 146 on Enclosed Return Postal Card.

Carrier-Mounted Crane-Excavator

A new Bucyrus-Erie carrier-mounted crane-excavator, with hydraulically-operated telescopic boom, offers reach and control advantages for crane work while retaining excavator flexibility.

Rated as a 12 ton crane the new 11-BH Series Two Transit Machine can be equipped for clamshell or dragline service and adapted to other attachments. A three piece telescopic boom with hydraulic control can be closed down to a minimum of 25 ft. A 12 ft. telescoping upper section provides 25 to 37 ft. short boom flexibility or, with intermediate section manually extended and pinned in place, 38 ft. to 50 ft. boom. An optional 10 ft. section can be added to the lower section for a total reach of 60 ft., and jibs are available in 10 or 20 ft. lengths.

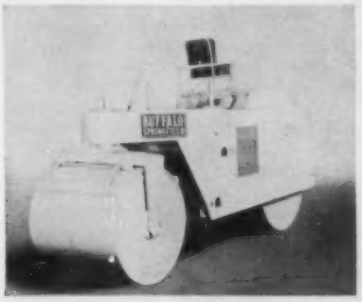
Bucyrus-Erie Co., South Milwaukee, Wis.

For more details circle 147 on Enclosed Return Postal Card.

Compaction Equipment

Two new models of road rollers and compaction equipment have been added to the existing line of Buffalo-Springfield machinery.

Equipped with low pressure hydraulic steering, dual controls and open



Compaction Equipment

New Products

grills over both ends of the drive rolls, the adjustable level gear final drives of the two new rollers are protected by fully-enclosed armored frames. Both models have machined rollers made from manganese alloy steel; high-speed, low-torque reversing clutches; and rust-proof sprinkler systems using brass pipes, copper tubing, and large capacity tanks equipped with filters.

Buffalo-Springfield Co., Div. Of Koehring Co., Koehring Co., 1210 Kenton St., Springfield, Ohio

For more details circle 148 on Enclosed Return Postal Card.

Stud Jack

The new Superior Concrete Form Stud Jack, Model 103, is designed to fit a wide variety of concrete and heavy construction jobs.

Featured is the fact that it bolts to the studs with ½ in. bolts, has a safety pocket with plated lag screw for guard rail post and goes up in a short time, according to the manufacturer. Designated the Model 103, it may be used individually or in series on panels. They hold flat for easy storage and hauling, are salvageable and are said to cost less than other types of scaffolds.

Superior Scaffold Co., 5624 Bankfield Ave., Culver City, Calif.

For more details circle 149 on Enclosed Return Postal Card.

Carbide Bits

A new carbide insert bit for use with the Mole-Dril has been announced by the Gardner-Denver Co.

Using premium grade carbide inserts, the bits are engineered to exacting specifications. The body is of top quality forged steel, according to the manufacturer. The new devices are available in sizes from 4¾ in. to 8 in. diameters, with the 1000 series drill steel sizes offered in 6 in. to 8 in. dia. The drills may be resharpened.

Gardner-Denver Co., Quincy, Ill.

For more details circle 150 on Enclosed Return Postal Card.

Warning Lights

A light that is designed to be used during daylight hours to provide an extra margin of safety for men working on streets or highways was announced by R. E. Dietz Co.

Available in either amber or red lense, the portable flasher can be used on either a mast or a tripod that raises the light to 11½ ft. The device is equipped with an eight in. parabolic reflector lens and the transistorized circuit produces 1365 candle power at the rate of 50 flashes per minute. Equipped

Portable Flasher

with carrying handle and mounting bracket, it weighs 12 lbs. without batteries.

R. E. Dietz Co., 225 Wilkinson St., Syracuse 1, N.Y.

For more details circle 151 on Enclosed Return Postal Card.

Asphalt Plants

Standard Steel Corp. has made available a trailer-mounted, 3000 lb. batch capacity model TM.

The manufacturer asserts that the entire drying and mixing unit is self-contained on its own trailer frame. It can be transported to any job location and may be set up and producing hot mix within a few hours utilizing the push-button erection device.

Standard Steel Corp., 5001 S. Boyle Ave., Los Angeles, Calif.

For more details circle 152 on Enclosed Return Postal Card.

Air Tubing

A new vinyl air tubing has been added to the hose line of the DeVilbiss Co.

Said to be ideal for use with pneumatic tools, the manufacturer states that it is equally useful for spray painting operations. With a ¼ in. I.D. and ½ in. I. D., the tubing has a working pressure of 150 lbs. and uses standard removable connections. Also added to the existing line of hoses is a flexible, lightweight, translucent hose which will not affect paint colors, according to the producer. It has a working pressure of 250 lbs. and is available in ⅛ in. and ¼ in. I. D. sizes.

The Devilbiss Co., Toledo, Ohio

For more details circle 153 on Enclosed Return Postal Card.

Portable Light Tower

A new portable light tower manufactured by Rig-A-Lite has recently been announced.

Called a Trav-A-Lite, the unit is skid mounted or trailer mounted and is said to be entirely self contained. The unit consists of a generator, extension tower and three or more flood lights. No guy lines are said to be necessary for the 35 ft. tower retracted. The mechanical erection and the extension of the telescoping tower are affected simultaneously.

Rig-A-Lite Co., 2102 69th St., Houston 11, Texas

For more details circle 154 on Enclosed Return Postal Card.

Portable Sandblaster

A new portable sandblaster that requires little air and may be used in various operations has been announced by Hamill Mfg. Co.

The new device will quickly clean dried cement, rust, dirt or paint from concrete trucks and construction ma-

Portable Sandblaster

chinery states the manufacturer. Over-all height of the unit is 23 in. with a tank dia. of 7 in., and weighs only 23 lbs. Featured are built in sand funnel, automatic opening and closing filler valve and a special vari-flow air operating valve.

Handi-Blast Div., Hamill Mfg. Co., Inc., Washington, Mich.

For more details circle 155 on Enclosed Return Postal Card.

Gooseneck Tilt Trailer

A complete new line of heavy duty gooseneck tilt trailers has been announced by Wisconsin Trailer Co.

Designed to haul such heavyweights as rollers, crawler tractors and backhoe shovels the trailer is available in 15,

Gooseneck Trailer

18 and 20 ton capacities. The beaver tail design gives the lowest possible climb angle during loading or unloading, which reduces the strain on equipment, states the manufacturer. Each model offers one man loading and unloading with automatic raising and lowering of the 8 ft. wide by 18 ft. long deck.

Wisconsin Trailer, Inc., Richfield, Wis.

For more details circle 156 on Enclosed Return Postal Card.

Tandem Roller

A new 1½ to 2 ton tandem roller has been announced by the Essick Mfg. Co. of Los Angeles.

Designated Model 220, the unit features over-all visibility of the roller, no greasing necessary, and automotive type

Tandem Roller

brake located on the compression roller. The rig is designed with constant-mesh transmission, readily accessible clutches, heavy duty roller chain and sprockets on the final drive.

Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif.

For more details circle 157 on Enclosed Return Postal Card.

Excavation Data Chart

A newly designed estimating tool for a quick estimate of a deep excavation has been issued by Contact Sheeting, Inc.

Based on 25 years of foundation experience and soil mechanics, the chart was worked out by Prof. D. M. Burmister, the head of the Soil Mechanics Dept. of Engineering at Columbia University. The design is applicable and safe for deep excavation used for buildings, highways and heavy construction projects, according to the producer.

Contact Sheeting, Inc., New York, N.Y.

For more details circle 158 on Enclosed Return Postal Card.

New Products

Sweeper-Blower

A self-propelled sweeper-blower rig that may be used for pre-marking cleaning has been announced by Topeka Highway Mower, Inc.

The Machine is capable of speed from one to 50 mph., using eight speeds. The blower has a 10,000 cu. ft. capacity which is generated by a large paddle type wheel, and is turntable mounted for right, left or center operations. The nozzle is manually swiveled through 360 deg. to attain any position desired. The broom is four feet wide and available in either fiber or wire and has five sweeping positions. The broom can be raised or lowered for travel and broom adjustment and is powered by a hydraulic motor and pump separate from the blower pump and motor.

Topeka Mower, Inc., 623 E. 7th St., P.O. Box 720, Topeka, Kan.

For more details circle 159 on Enclosed Return Postal Card.

Electrotape

An electronic tool, based on continuous-radar principles, which provides surveyors instantaneous information as it measures distances from 250 feet to 50 miles, has been announced by the Cubic Corp.

Surveyors can chart hundreds of miles in a normal working day, limited only by their ability to travel to the points to be surveyed, according to the manufacturer. The unit includes an attached parabolic reflector; an operational setup consists of two or more identical portable, tripod-mounted stations. The continuous transmission of microwaves from one unit to the other, and back again, gives the surveyors instantaneous distance information. The measurement is easily converted into precise linear distances of in., ft., yd., or miles. Equipment accuracy was slated to be 3 parts per million, plus or minus 1 inch.

Cubic Corp., 5575 Kearny Villa Rd., San Diego 11, Calif.

For more details circle 160 on Enclosed Return Postal Card.

Shock-proof Lamps

"Shock-proof" head or tail lamps for construction and off-the-highway tractors or equipment have been announced by the John W. Hobbs Division of Stewart-Warner Corporation.

The glass beam element is held in place by a heavy duty neoprene ring. Elimination of metal-to-glass contact has resulted in shock and vibration protection. In addition, changing of the element is made quick and simple. The beam pattern is locked in position at all times, and 90-degree indexing, which permits using the beam pattern in different positions, is made possible by locator notches on the inner diameter of the ring. Models are available in the conventional 4½" and 5¾" sizes in three basic design types, the bell type, and two of the flush variety for mounting on smooth surfaces.

Stewart-Warner Corp., 1826 Diversey Pkwy., Chicago, Ill.

For more details circle 161 on Enclosed Return Postal Card.

Reputed to be the world's largest tire, this Firestone product is more than 10 ft. high and four ft. wide. Tubeless, the tire is used with giant equipment on soft terrain and in the Arctic.

Job Safety

110-Volt Current Can Be Killer

There is a tendency to regard the hazards that may develop with 110-voltage lighting circuts as minor ones. So notes George E. Aro of United Engineers and Constructors, speaking in the National Safety Council's "Safety Hints."

Given the "right conditions," however, even lower voltages are potential killers. "Right conditions" are moist skin and the individual being grounded, said Aro.

The resistance of dry human skin to electrical current is quite high—100,000 to 600,000 ohms. But the resistance of wet skin drops to as low as 1,000 ohms. The resistance of the internal body, hand to foot, is 400 to 600 ohms.

Current flow *through the body* is the factor which causes injury in elecrtic shock. Current values affecting humans are: 8 to 15 milliamperes . . . painful shock; 15 to 20 milliamperes . . . loss of muscular control; 20 to 50 milliamperes . . . severe msucular contractions; 50 to 100 milliamperes . . . possible ventricular fibrillation (a heart condition that results in death); and 100 to 200 milliamperes . . . certain ventricular fibrillation.

When artificial lighting is required for work in damp or wet places (such as tunnels and sewers) or in metal enclosures (such as tanks, boilers, condensers, and similar metal containers), this review recommends that a 6-volt or 12-volt portable lighting system should be used. Such a system employs a transformer that reduces such voltages as 110, 115 and 125 to 6- or 12-volts and that is covered by a molded rubber jacket and rubber covered primary and secondary leads.

The primary lead and transformer are placed outside the vessel or damp area, and only the 6- or 12-volt lamp and secondary lead are taken in with the workman.

Flagmen Instruction

The Utah state department of highways has published an illustrated folder for use of flagmen. The new leaflet gives uniform instructions for all flagmen working on highway construction and maintenance jobs in the state. Three-color illustrations showing correct procedures are a feature.

According to Keith M. Macfarlane, Safety Coordinator, the folder will be distributed to contracting firms as they are awarded jobs. It will also serve as a guide to Utah department maintenance crews.

The foreward of the leaflet states: "The job of being a flagman is an important one. The lives of workmen and those of the traveling public can be in your hands. This leaflet has been prepared to help you in understanding your duties."

Contractor Reports Big Concrete Paving Yardage

One of the largest, if not the largest highway concrete paving yardage performances reported for 1959 by a single contractor was that of Koss Construction Company of Des Moines, Iowa. This firm with branch offices in Kansas and Missouri built 1,572,639 sq. yd. of concrete pavement during the year, equivalent to 112 miles of 24-ft. road. The company has an almost identical amount of work under contract for 1960 completion.

According to a bulletin in the Koss employees' house organ, management of the multiple job operations has been expedited by the use of airplanes. The company has just replaced its original plane with a Twin Beech Super G-18. The company's executive's expect to log 800 hours or 160,000 miles during the present year.

The Koss Company has long been proud of its veteran employees and recently has expanded its profit sharing and retirement program for key employees with 65 people presently participating.

Also the company is proud of its safety record, and recently announced that its Missouri Division had operated 555 days without a lost-time accident, and the Kansas Division 537 days.

Concrete paving awards for the first six months of 1960 totalled 30,635,000 cu. yd., according to the Portland Cement Association. Road projects accounted for 62 percent, streets and alleys 30 percent, airports 8 percent.

HELP WANTED

TRAFFIC ENGINEER
$755 to $940 MO.

Engrg. college grad. with 5 yrs. prof. engrg. exper. 4 yrs. of which must have been in traffic engrg.; 2 yrs. at supervisory level.

TRAFFIC ENGRG. ASSOC.
$641 to $797 MO.

Engrg. college grad. with 3 yrs. engrg. exper. 2 yrs. of which must have been in traffic field. A Calif. registered Engineer receives $677 to $842 MO.

Applicants outside the So. Calif. area need not come to Los Angeles prior to appointment.

Write immediately to Civil Service Dept.
Room 5, City Hall, Los Angeles 12, Calif.
MA 4-5211, Ext. 2442

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COMPLETE

GRADING AND ASPHALT SPREAD

All Equipment located Columbus, Ga. and Atlanta, Ga.

1—Cat D9 with blade.
4—Cat D8's with angle blade.
3—DW20's, excellent condition.
3—DW21's Turbo Engine - 3C Roadsters, GM Engines and PD19 Scrapers.
1—Late LeTourneau C Dozer.
3—2½ yard shovels 80D's.
2—3½ yd. Draglines, very new.
2—195 Northwest 2½ yard draglines.
6—¾ yard Draglines, diesel.
4—Sheepfoot Rollers, McCoy 60"
1—10 Ton 3 wheel roller, diesel.
2—Tandem 10 Ton Rollers, like new.
2—Barber-Greene finishers, 879A and 879B.
3—600′ Rotary Compressors.
2—500′ Compressors, piston type.
1—Joy Rotary Drill, mounted on tractor.
1—608L Link Belt Dragline 80 ft. Boom 3½ yd. Bucket used less than 3000 hrs.
1—Model 175A Michigan Loader.
2—25 Ton Truck Cranes (Lorain).

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CONSTRUCTION EQUIPMENT IN EXCELLENT CONDITION

Michigan Model 175-A Front End Loader 2½ yard Bucket—Serial #2839
Tractor & Dozer Caterpillar Model D-9 Serial #19A 797
Tractor & Dozer Caterpillar Model D-9 Serial #19A 849
Tractor & Dozer Caterpillar Model D-8 Serial #14A 4529
Tractor & Dozer Allis-Chalmers Model H.D.-16 Serial #HD16-1071
Letourneau-Westinghouse Tournapull Model D Serial #60163
Scraper Model DM Serial #590173
Buffalo-Springfield Kompactor Model K with Cat Diesel Engine Serial #28868
Shield Bantam Truck Crane & Backhoe Attachment Model 300

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LIMA Model 34 w/Camel Back Backhoe - ¾ yd. Model HRC Cummins Diesel Engine. Excellent condition. 1958 machine used approximately eight months.
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GALION 8-12 Ton Tandem - Powered by 6 cylinder Continental Gas - equipped with torque Converter and Sprinkling system. Approximately eighteen (18) months old and in excellent condition.

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1 ea. 100 Ton Berger Crane (Gantry "A" Frame Type) Cab Operated, Main Hook fixed at center of double girder bridge, A.C., hook speed 4.5 fpm. Ten-ton auxiliary hoist full bridge travel D.C. max. hook speed loaded 90 fpm. Drums for 175 ft. lift, hook 28'3" max. raised position above crane rail span 46′.

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4 ea. Series 4620 M Hawkeye Passenger Elevators 2000 lb. capacity (8 passenger) 160 LF vertical monorail in 10-ft. sections.

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- Frame reinforcements
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$50.00 each

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4' x 14', on skids, about 10 gauge, 1850 pounds each. Cost government $1,800.00 each. Were used for shipping containers for airplane engines.

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85 KW KATO type 5157 generator set, S/N 36910-106 KVA,. 220/440 volt, 279/139 amp, 1800 RPM, 60 cyc. 3 phase, with G.M. 671-RC-13 engine, S/N 6A-41271. Located at Dalworth Mach. Co.—Dallas, Tex. $5,000.00

ATHEY Model 125 Force Feed Loader, S/N 111, with 6 cyl. Ford enbine. Located at Dalworth Machinery Company—Dallas, Tex. $5,000.00

ATHEY Model 125 Force Feed Loader, S/N 111, with 6 cyl. Ford engine. Located at Dalworth Machinery Company—Dallas, Tex. $5,000.00

KOEHRING 605 Crane, S/N C-9957, w/Cat. D-13000A engine, S/N 43-13367, w/2000 watt Kohler light plant—Amarillo, Tex. $7,500.00

BARBER-GREENE 24"x30' Port. Conveyor S/N 363-1156 on swivel wheel truck—Amarillo, Tex. $2,200.00

30"x30' 8" Channel Conveyor from plant above to hopper w/10 HP Motor—Amarillo Tex. $1,750.00

KOLMAN Model 101 Channel 36"x50' portable Conveyor S/N 58-1-36-50, w/25 HP Motor and 36"x50" Kolman Buzzer ScreenAmarillo, Tex $7,000.00

FERGUSON 5-8 ton Tandem Steel Wheel Roller, S/N 58170 w/Continental FA 162 engine, S/N 2764—Amarillo, Tex. $3,800.00

LeTOURNEAU Ripper on 2 steel wheels—Amarillo, Tex. $1,525.00

30"x30' Job made 8" Channel Conveyor w/7½ HP Motor for above Scalping Plant—Amarillo, Tex. $7,800.00

UNIVERSAL 24" dia. x 20" wide, type H-02-NC Hammermill S/N H-8 h/75 HP Westinghouse Motor Falk reducer—Kenner, La. $2,500.00

CEDARAPIDS type CGC, 30 ton per hour Gradation Control Unit, S/N 16610 with Cold elevator, Cedarapids horizontal vibrating screen, Continental Y-112 engine —Kenner, La. $7,800.00

(2) Skid mounted (12"x18"x22' I-beams) York Ammonia refrigeration units complete with the following each: 40 HP York model D-8 compressor S/Ns 282103 and 282110, with 40 HP Motors; York Chiller; (2) York 16" dia x 16' long compressor tanks; 1½ elect. water pump; extra Haven Model 33-40 40" fan cooling tower for each rig. 40 Ton Located at Dalworth Machinery Company—Dallas, Tex. $7,500.00

INTERNATIONAL PH-6S, 18 C. Y. "Payhaulier", S/N 679 w/Cummins NT-6-BI, S/N 180586, Purchased new in June 1958, located at Dalworth Machinery Company—Dallas, Tex. $9,000.00

94KVA Crocker Wheeler, Model 52-8-4 Generator Set, S/N 1105721, w/1.5 KW exciter,G.M. engine 6045A, 6 cyl. S/N 6-12824. Located at Dalworth Machinery Company—Dallas, Tex $5,000.00

ATECO Ripper, Model HR TO-24 (for TD-24 Intnl.) S/N 8728—one shank. Located at Dalworth Machinery Company—Dallas Tex. $3,000.00

105 Cu. Ft. Ingersol-Rand Model 105C Air Compressor, Serial No. 1504, with F 162 Continental Engine, S/N F 147983—Amarillo, Tex. $1,500.00

30-325 Amp. 40V. P&H Model WN250 Arc Welder on 2 wheel, S/N 20609, with Waukesha Model 180GLB engine, S/N 1012037—Amarillo, Tex. $600.00

300 Amp, 40V, Lincoln Code 3545, Arc Welder, S/N A-378823 on 4 wheels, w/F-244 Comtnl engine, S/N 204-4734—Amarillo, Tex. $800.00

LeTOURNEAU Model A "Tournacrane", S/N C-4116-A-A pulled by LeTourneau Model C-1 tractor, S/N C3T-4250-C1-G, w/HBID Cummins engine S/N 17667—Amarillo, Tex. $7,500.00

Model 38 General 20-25' Concrete Screed Finish, S/N B 2945 w/Continental Y 112 engine S/N 55708—Purchased new in July 1956—Coldwater, Miss. $6,500.00

Model LF2A KOEHRING 25' Concrete Bullfloat, S/N LF-1534, w/AEH Wisconsin engine—purchased new in July 1956—Amarillo, Tex. $3,500.00

12" KOEHRING Concrete Bullfloat, S/N LF1189, w/Model AEH Wisconsin engine—Amarillo, Tex. $2,000.00

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FERGUSON Model AHH Planer, S/N 125 w/Wisconsin Model AHH engine—Amarillo, Tex $4,000.00

34E KOEHRING Paver, S/N 18382 with 471RC63 G. M. engine, S/N 4A-20537—Ruston, La. $10,000.00

LeTOURNEAU "D" Roadster S/N GT 8797DRV w/G. M. Model 4055D engine, S/N 4A-39992—Coldwater, Miss. $6,500.00

BUCYRUS-ERIE Tractor drawn Model S-112 Scraper, S/N 52409—Amarillo, Tex. $3,000.00

CATERPILLAR D-8 Tractor, S/N 2U-6378 with No. 25 cable control, S/N 9D-7856, and 8S dozer S/N 8A-2198 —Amarillo, Tex. $7,500.00

CEDARAPIDS 40x33 Hammermill, S/N 20562, purchased new in Sept. 1958. Located at Conley-Lott Machinery Co. —Dallas, Tex. $8,500.00

7,000 to 8,000 LF of 22"x24"—10' long Rex Dual Duty Airport Forms. Purchased new in April, 1958. As is, where is, $6.00 per LF or lump sum—Amarillo, Tex. 45,000.00

(2) 30"x5' Horizontal material feeders w/8 yard hoppers —Amarillo Tex. ..... each $500.00

Sand Tunnel—330' long, 234' of 8 gauge multiplate (ELL 96x108) with 18 hoppers—Amarillo, Tex. 15,450.00

Note: (3) Syntron "Vibra Flow" Feeders available for use with this funnel @ $1,000.00 each

Gravel Tunnel—231' long—115' of multi-plate with 18 material hoppers—Amarillo, Tex. $9,500.00

24"x315' 6" Channel Tunnel Conveyor for above Gravel Tunnel w/15 HP Motor—Amarillo, Tex. $5,140.00

Double 30" included Lattice Conveyor with (2) 195' conveyors over and under w/(2) 50 HP Motors. One new belt installed in July 1959 and used 4 months. 4 Motorized pulleys available for use with this at extra cost—20, 30, 40 and 50 HP—Amarillo, Tex. $14,200.00

36" Straub "Kue Ken" Gyratory Cone Crusher, coarse bowl, S/N 14636-9, w/60 HP Century Motor—Amarillo, Tex. $10,700.00

24"x145' Job made 8" Channel Conveyor w/20 HP Motor—Amarillo, Tex. $3,000.00

36"x18' Job made 10" Channel Conveyor w/10 HP Motor—Amarillo, Tex $2,200.00

30"x25" Job Made Channel Conveyor w/10 HP Motor —Amarillo, Tex. $1,400.00

30"x42' Job Made 10" Channel Conveyor w/7.5 HP Motor—Amarillo, Tex. $1,400.00

6'x16' Simplicity 3 deck Model DR Horiz. Vibrating Screen, S/N 3616-DR-1150-S w/30 HP Motor—Amarillo, Tex. $7,000.00

36" Straub "Kue-Ken" Gyratory Cone Crusher, Medium Bowl, S/N 14536-9, w/75 HP Motor—Kenner, La. $10,700.00

KOEHRING Model LF-2A, 20 24' Concrete Bullfloat S/N 1395 w/Wisconsin AEH engine—Sherman, Tex. $3,500.00

(2) Model AG Stow portable concrete vibrators, w/Model ACN Wisconsin engines—Amarillo, Tex. ..... each $200.00

NORTHWEST Shovel Attachment for Model 6 Northwest Crane w/extra AMSCO bucket—Amarillo, Tex... $4,500.00

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Model 95 Diamond Iron Works Crushing Plant complete with Model 24 Primary unit consisting of: 24"x36" Jaw Crusher, 3-30" Lattice Conveyors, w/Caterpillar RD-8 engine; and secondary unit with: 40"x22" Roll Crusher, 4'x12' vibrating screen, and 2½ CY screen hopper mounted on truck frame—Amarillo, Tex. $25,000.00

HELTZEL type 11, Model 200, 200 Ton Batching Plant w/3—50 Ton Agg. and 1—230 Bbl. Cement Compartments, S/N W-2295, purchased new in August, 1958—Completed one job since purchase—Sherman, Tex. $22,000.00

W. E GRACE, 2-Car, Model 43, Rapid Fire Tank Car Heater, S/N 180, w/LeRoi Model D-140 engine—Sherman, Tex. 1,500.00

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2—Ingersol Rand paving breaker (each) 200.00
1—Lot of drill steel 6 to 10' lg. $1.00 per ft.
1—Skill Saw & Black & Decker electric hammer (for both) 75.00
1—Page 1 yd. Dragline Bucket RM. .. 250.00
The above items located in Mpls.
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FOR SALE

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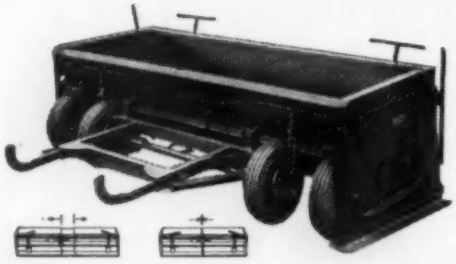

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— ROAD CONSTRUCTION EQUIPMENT
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— OFFICE EQUIPMENT
— TOOLS

RAULSTON CONSTRUCTION CO.
NO. 1717 IN BANKRUPTCY

SATURDAY, AUGUST 13, AT 11 A. M. EDST
FARNHURST, DELAWARE

By virtue of an Order of the Honorable H. Newton White, Referee in Bankruptcy, for the District of Delaware, there will be exposed to public sale at Raulston Construction Co., at DuPont Highway, Farnhurst, Delaware, on the 13th Day of August, 1960, the following described goods and chattels:

MOTOR VEHICLES

Dodge 1 Ton Stake Truck
Dodge 2½ Ton Dump Truck
Dodge 2½ Ton Dump Truck
1955 Chevrolet 2 Dr. Sedan
1959 Dodge ½ Ton Pickup Truck
2 Dodge 1 Ton Stake Trucks
Dodge 2½ Ton Dump Truck
1958 Dodge ¾ Ton Pickup Truck
etc. etc. etc.

ROAD CONSTRUCTION EQUIPMENT

Caterpillar No. 12 Motor Grader
Caterpillar D7 Tractor equipped with No. 7S Bulldozer, No. 46 Hydraulic Control Unit and No. 2S Cable Control
Brockway Tractor
BC American Crawler Crane, 3¼ yd. Gooseneck Backhoe
FMDV-14 Fordson Major Diesel Tractor, with Sherman power digger and Sherman Loader
NAA-Lorn Tractor with 130 Wagner Loader
1954 25-Ton Rodgers Flatbed Trailer
G9 Ton Buffalo Springfield Roller
2 D4 Caterpillar Tractors with Bulldozers
D7 Caterpillar Tractor with Bulldozer
Gill Seeder
Page Line Bucket
Lot Concrete Forms
D6 Caterpillar Tractor with Bulldozer
Scraper No. 70, Hydraulic with Cable Control
Kellog American Air Compressor (grease rig)
Caterpillar Scraper Wagon
Tractor with Backhoe attachment and Loader
International Water Truck
1953 GMC Fuel Tank Truck
1954 Rogers Semi-Trailer
1956 Bucyrus-Erie 22-B Crane with Backhoe and Crane Boom to fit above
Fruchauf Box Trailer
Wayne Impactor
Owens Bucket-Clamshell
Dragline Bucket
Etc. Etc. Etc.

TERMS OF SALE

No private deals. No shills. The public is urged to come bid & buy any or all.

The goods are to be sold free and clear of liens. 100% of the bid price shall be paid in cash to the Trustee at the time the property is struck off, balance in cash or certified check on or before August 18th, 1960 prior to removal of goods. The goods must be removed from the premises by 5 p.m., on August 19, 1960. Arrangements for removal other than the day of the sale must be made with the Trustee.

Confirmation is to be considered by the Referee at 10 a.m. EDST, on August 15, 1960 in Room 209 Federal Building, 11th & King Streets, Wilmington, Delaware.

INSPECTION: 1 to 4:30 P.M. EDST, August 10, 11, and 12. Any other time by appointment with J. F. Toner, Jr., Auctioneer. Phone Wilmington, OLympia 4-6771.

DIRECTIONS: How to get there.
Sale site is on U. S. Route 13 on the Delaware Side of the Memorial Bridge, near Continental Block Co.
Going south from Wilmington, 3 miles South of Pa. RR. Station at Front & Market Street. (61 by cab) Take 2nd left turn after passing State Hospital (1st turn left past Gateway Restaurant). Stay on paved road down a slope 400 yards to white building.
Going north from Baltimore or Dover, Delaware. Just **before** the turnoff to Delaware Memorial Bridge turn right at Rayco Seat Cover Shop and Sunoco Station. Stay on paved road down a slope 400 yards to white building.

The above-mentioned goods are sold pursuant to the terms and conditions contained in the Referee's order, a copy of which is on file in the Referee's office, Room 209, Federal Bldg., 11th & Market Sts., Wilmington, Delaware

JACOB KRESHTOOL, Trustee
1006 Bank of Delaware Building, Wilmington, Delaware.

FOR SALE

F.O.B. MEMPHIS, TENNESSEE

1—Parsons Model 88-1B Trenchmobile, Serial No. 2685, 5 ft. max. boom depth ..... $ 3,000.00
1—Parsons Model 221-2A Trenchliner, Serial No. 2552, with D-315 Caterpillar Engine, equipped with 36" side cutter bars for 24" buckets, 4' conveyor extension & 10' boom extension 8,500.00
1—MANITOWOC Model 3900 Crane, Serial No. 32008, Cummins N4RS Diesel Engine - Torque, equipped with 20'4"x 48" Tracks, "A" Frame Gantry, Independent 100 ft. boom and 3.5 Kohler 3500 M Light Plant 80,000.00
1—VULCAN No. 0 Single Acting - Air or Steam Hammer. New condition and plain type driving head for No. 0 Hammers and 18" square concrete pile, Serial No. 4331 ..... 11,000.00
1—Lima Model 603 Dragline, Serial No. 1463. 60' boom, 6WAL Waukesha Gas engine, 24" shoes x 13' tracks 14,500.00
1—Blaw-Knox Road Widener, Serial No. 955053, Continental F-226 Engine, 8:25 x 20 Rear Tires. All in excellent condition 10,000.00
1—Galion Trench Roller, Serial No. 35187. New Condition 4,250.00

Hawkins Equipment Co.

1475 Thomas St. - P. O. Box 4695
MEMPHIS 7, TENNESSEE

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80,000 Gallon Tank—Simplicity with coiled center well. Great for MC's, RC's and emulsions. Can be taken apart and shipped in one R.R. car.

50 TPH Dryer. Material wet? Could be used as pre-dryer.

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PIONEER PORTABLE WASHING PLANT, Model 412VW, w/4x12 screen, twin sand screw, conveyors, feeder, engine, pneumatic tires. Good. $15,000.

(2) EUCLID 22 TON END DUMPS, 36TD13038 & 36TD12707, w/Cummins diesels, torque converters, 1953 year, excellent rubber & condition. Used for hauling shale only. Priced for quick sale Damascus, Virginia.

EUCLID Twin Power Motorscraper, 18-24 cy., mdl. 68FDT tractor w/17SH scraper, two 200 hp. GM diesels, torque converters, rubber 80% new, rebuilt, excellent. $18,000 Rental Purchase Yard.

UNIVERSAL 293Q Portable Plant w/1624 rb. Jaw, feeder, 16x24 & 14x24 Twin dual roll, 3x10 2-deck screen, rotovator, plant and delivery conveyors, mounted tandem axles, late model, very good. $18,500. Cumberland, Maryland.

CEDARAPIDS 2036 rb. Jaw Crusher Portable Primary w/3x8 apron feeder, hopper. Cat. D8800 diesel, underconveyor, tandem rubber, rebuilt, like new, $18,500. Yard.

CEDARAPIDS 2A Portable Plant w/1624 double roll, 3x10 2-deck screen, rotovator, power, two delivery conveyors, tandem axles, apparently unused. 40% new price $11,000. Yard.

CEDARAPIDS Pitmaster Portable Plant w/1016 Jaw, feeder, 1616 rolls, 3x10 2½-deck screen, rotovator, power, rubber, good. $11,000 Yard.

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SHOVEL FRONTS for P&H 655B, new, complete. $5000. Lima 34, chain, good, $1000.

BACKHOE ATTACHMENTS for P&H 655, new. $4000. P&H Mighty Mite, like new $975.

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1—John Deere 40 Crawler with blade—fair.

1—I-H T6 with Heil blade, good.

1—Oliver OC46 with loader, 1958—excellent.

1—Ford 850 with Wagner loader—fair—priced to sell.

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1—EUCLID TS-24 Twin Engine Scraper, 1957	37,500
1—EUCLID S-18 Scraper, 1955, overhauled	26,000
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Available As Straight Dozer Only

Dozer Will Mount with Old Style Overhead Bar or Streamline Front Shroud

STREAMLINE SHROUD with Sheave Group
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Cedar Rapids 30x22 portable roll secondary plant, return wheel and 4x10 screen.

D8 Cat with No. 25 DDPCU and Cat 8S dozer blade.

Portable Complete Cedar Rapids 3042 Impact Crusher.

Adams 610 Grader 6-cylinder diesel, power steering, 1400x24 tires all around. (I have two and will sell one) (take pick).

60'x20" portable conveyor new belt, gas power.

Above machines all in good condition and working at present time.

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1—Cleveland Trencher, Wheel Type Model 140 S/N 5944; International Diesel Engine. CONDITION —EXCELLENT $12,000.00

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1—605 Koehring, 70' Boom, clam and drag combination, no buckets, Cat. 13000 Engine. Location—Hammond, Iowa.

1—34 Lima Paymaster, long and wide crawler dragline—backhoe combination, diesel engine. Location—Denver, Colorado.

2 Model 34 Lima Paymasters, dragline and clam combination. GM Diesel and Buda Gas engines. Location, St. Paul, Minnesota.

1 Model 25 Northwest Dragline, 318 Cat. diesel. Location—St. Paul, Minnesota. PRICED TO SELL.

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New England Construction Auction is in business to sell qualified construction equipment. We are NOT dealers or distributors. We sell your saleable equipment direct to a ready made market. There's no charge unless the equipment is sold. Call us for complete information.

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Nashua Phone: TUxedo 2-7581
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'56 Diamond T Dump — Gar Wood 5-7 yd. body, New Engine, 2 speed rear.

DIESEL TRACTORS
GMC, Mack International C.O.E., Sleepers and Conventional

'57 Ford — 1 ton pick up

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750 GMC; KB11 International; '51 Brockway, excellent engine

'56 International chassis and cab for 14' body — reinforced frame—new 8.25x 20 tires.

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103 N. Beacon St.
BOSTON, MASS.
STadium 2-2900

FOR SALE

Caterpillar 12 Grader 8T, Cab, large tires, Caterpillar Power Steering	$5,950.00
Cat 70 Scraper, Large Tires	5,750.00
LaPlant-Choate C106 Scraper	1,750.00
LeTourneau LS Scrapers 8-11 yds.	2,750.00
Buffalo-Springfield KT16C4 Roller	3,975.00
Parsons 88 Ditcher on Rubber	1,750.00
Barber-Greene 706B Ditcher	2,250.00
Cat D13000 Power Unit Complete	1,250.00
Cat D337 Power Unit Complete	1,500.00
Murphy ME650 Power Unit Complete	1,500.00
Fruehauf 30 ton Lowboy Tandem	3,000.00
Allis-Chalmers D.P.C.U.	250.00
LaCrosse 25 Ton low boy, 10.00x15s	2,250.00
American Oil Field Float, 28	975.00
G.M.C. 620 Tandem Dumps (2) each	2,650.00
Hyster D6N, D8L Towing Winches.	
Lorain 41 or 50 New Shovel Front	1,500.00

AL. FISHEL & CO. — JEfferson 5-4482
1318 N. Vandeventer Ave., St. Louis 13, Mo.

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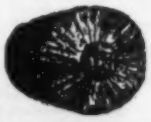

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Street Push Brooms

Brushes for Every Industrial Need

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1—D-8 Pusher Series 15A
3—DW-15 Series
2—DW-10 With Number 15 Scrapers
3—DW-21 With Turbo Engines

SHREVEPORT EQUIPMENT COMPANY, INC.
P.O. Box 1532, Shreveport, Louisiana
Telephone: 3-8421

USED TIRES

1100x20 ..... $32.50
1200x20 16 ply 37.50
1300x24 Grader 6 ply 42.50
1300x24 Grader 8 ply 47.50
1400x20 ..... 42.50
1400x20 Grader 54.50
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2100x25 Lug Tread 240.00

All Tires are Original Tread Perfects and No Repairs

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FIRST LINE

700x15 6 ply Tires 24.82
825x20 10 ply All Duty Tires. 57.47

Tax Included in the Above Prices

We will issue credit on long distance calls when purchases are completed.
We will require 25% with order balance. C.O.D. Freight Collect.

MENDOTA TIRE SERVICE
808 Main Street Phone 2236
MENDOTA, ILLINOIS

FOR SALE

Allis Chalmers, HD-11B Dozer, late model, low hours, excellent, $11,000.00. Schield Bantam Truck Cranes $2750.00 up. Oliver OC-12 Crawler loader, dozer, rebuilt, $5500.00.

GENERAL EQUIPMENT MACHINE CO.
511 E. Colfax
South Bend, Indiana

EUCLIDS FOR SALE

5—Model 27FD Euclid 15 ton rear dump Trucks, Cummins engines, Serial Nos. in the 6800's. Very good tires.
2—Model 46TD Euclid rear dump 22½ ton trucks, 300 H.P. Cummins engines, power steering, S/N 14675-14676, new 1954.
2—Model 31TD Euclid rear dump 22½ ton trucks, 300 H.P. Cummins engines, power steering, S/N 13065-13066, new 1953.
8—Model 3TD Euclid rear dump trucks, 22 ton, 275 H.P. Cummins engines, power steering, Serial Nos. in 4900's.
1—Model LVX Mack rear dump truck, 22½ ton, 300 H.P. Cummins engine, power steering, S/N 1664, new 1959.
5—Model 25FDT Euclid bottom dumps, Cummins diesel engines.
5—Model 43FDT Euclid bottom dumps, GMC diesel engines.

FRANK F. FAMALETTE EQUIPMENT CO.
P. O. Box 325, Hazleton, Pa. GL 5-4708

EARTHMOVER TIRE SPECIALS TIRES

TRUCK–EARTHMOVER–TRACTOR–
TRAILER–GRADER–AIRPLANE–FARM

SPECIAL—1400x24 20 Ply 75% Tread $90.00

750x20 8 Ply	825x20 10 Ply	900x16 8 Ply	900x20 10 Ply	1000x20 12 Ply
16.50	**22.50**	**18.50**	**28.50**	**32.50**

1000x22 12 Ply	1100x20 12 Ply	1100x22 12 Ply	750x15 TRAILER 10 Ply	825x15 TRAILER 12 Ply	1000x15 TRAILER 14 Ply
32.50	**34.50**	**34.50**	**22.00**	**31.00**	**38.00**

EARTHMOVER			GRADER		
1200x20	14 Ply	45.00	900x24 - Rib -	10 Ply	35.00
1400x20	16 Ply	65.00	1000x24	8 Ply	40.00
1600x20	16 Ply	145.00	1100x24	8 Ply	40.00
1600x25	24 Ply Ny. Ret.	395.00	1200x24	8 Ply	45.00
1800x24	16 Ply	225.00	1300x24	8 Ply	45.00
1800x24	24 Ply Nylon	325.00	1300x24	12 Ply	55.00
2100x24	20 Ply	325.00	1400x20	12 Ply	50.00
2400x25	20 Ply	450.00	1400x24	12 Ply	65.00
2400x29	24 Ply	395.00 Up	1600x24	12 Ply	185.00
26.5x25	24 Ply	495.00	10 - 28	4 Ply	25.00
29.5x29	24 Ply	550.00	11 - 28	4 Ply	47.50
2700x33	32 Ply	850.00	14 - 30	6 Ply	30.00
33.5x33	32 Ply	950.00			

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ARROW TIRE COMPANY
OPEN EVERY SATURDAY UNTIL 5:00 P.M. — SUNDAY BY APPOINTMENT

FOR SALE

We have four Model 5535 Rocket Mixers rated at 3½ cubic yards. They are mounted on single axle F750 Ford trucks which have 900x20x10 ply tires. The mixers and the trucks are in top shape. The trucks will average approximately 11000 miles as of this date.

Additional information and prices on request.

HOWELL CONSTRUCTION COMPANY
Post Office Box 802 Carbondale, Illinois

1 Used Sealcoat Applicator—seals 100,000 square feet per day—save 75% of labor costs—power brushes and squeegies—excellent condition.
1 101 Adams Grader. Sell outright or trade.

SPRINGFIELD BLACKTOP, INC.
516 Northwood Drive, Springfield, Ohio

FOR SALE

GOOD TO EXCELLENT CONDITION
BARGAIN

Complete Pioneer Sand & Gravel Plant, revolving screens. Eagle course material washer. Now producing aggregates to State of New Jersey standards. $12,000.00

Four Harvester TS-75 Pay Scrapers, New 1956 and in top condition—70% rubber. .....each $17,500.00

Three Barber-Greene Black Top Pavers, 879A. Priced from $5,000.00 to $8,000.00.

Barber-Greene 848-5-12 continuous mix asphalt plant, low pressure air, new 857 dust collector, dismantled and ready to load. $22,500.00

Link-Belt Truck Crane . . . HC90. .....$21,500.00

Lorain Moto-Crane with 50 ft. boom. Cat. #318 .....$21,500.00

Byers Model 83 with generator and magnet. 40 ft. boom. Price $11,500.00

Terms can be extended to those who qualify.

CLAREMONT MACHINERY, INC.
734 15th Street, N. W. Tel. EXecutive 3-0118
Washington 5, D. C.

Oregon: "No Politics in Our Department"

(From the employes magazine of the Oregon State Highway Department)

We are proud of the fact that in the Oregon Highway Department we are completely free of any political activity or influence—either in employment or in any other matter.

In keeping with this, and the fact that this is a year of both primary and general elections, we would like to remind all employees that we are covered by both the Federal Hatch Act (for the reason that we receive federal aid) and by the State Civil Service Act.

Under these regulations, it is provided that:

No employee shall use his official authority or influence to further the cause of any political party, or candidate for nomination or election to public office;

No employee shall seek or accept nomination, election or appointment as an officer of a political party, club or organization, or serve as a member of a committee of any such club or organization;

No employee shall be a candidate for a political office;

No person shall solicit from any employee money, service or other valuable thing to further the cause of any political party, or candidate for nomination or election to public office.

Political activities not prohibited by law, such as the holding of strictly local non-partisan offices, are authorized except in instances where such activities may interfere with performance of state duties, or may be incompatible with an employee's assignment.

In keeping with this last provision, highway department employees are prohibited from being candidates for City Councilman or County Commissioners for the reason that individuals in such offices must pass upon matters concerning roads and other subjects with which the highway department is concerned, and could be placed in a position of having to elect between the interests of the city or county and the Oregon State Highway Department.

However, all employees are urged to follow all political issues as intently as they desire; and above all to excercise one of the great privileges of citizenship—the right to vote.

Manufacturers' Literature

CUTTING EDGE: Featured in a 2-color booklet just released by Caterpillar Tractor Co., Peoria, Ill., are reports discussing the benefits of well designed induction-hardened edges, and the features and benefits of multi-section dozer and scraper edges. The booklet, "Best by Job Test," demonstrates less down time, longer life and costs per hour.

For more details circle 162 on Enclosed Return Postal Card.

TRAFFIC MARKING TECHNIQUES: Traffic marking techniques for all purposes are detailed in a new brochure supplied by the Trafficaide Corp., Auburn, N.Y. The firm manufacturers an extruded vinyl strip which is a permanent- type market that is reflective and readily bonded to pavement. Included in the brochure are diagrams showing variations of anti-skid directional reflectionized arrows, center lines, crosswalks or loading zones and others.

For more details circle 163 on Enclosed Return Postal Card.

AIR COMPRESSORS: A new four page folder describing a line of portable air compressors was recently released by P. K. Linsay Co., Inc., Everett 49, Mass. The engine is connected directly to the compressor, making a belt unnecessary. The unit comes equipped with an automatic unloader. According to the literature, the units come with electric starters as standard equipment and semielliptical springs, which makes it trailable at automobile speeds.

For more details circle 164 on Enclosed Return Postal Card.

PAVER CONSOLE: A new operator's control console that simplifies operation of the redesigned Express Paver is described in a new bulletin from Blaw Knox Co., Construction Equipment Div., Mattoon, Ill. The literature explains the control panel, from which a 10 ton capacity folding hopper, traction clutch and similar equipment are hydraulically manipulated. Going on, it explains the wheel-type power steering and the rubber-tired unit's automatic feed control, and exclusive automatic screed level control and hydraflated tires.

For more details circle 165 on Enclosed Return Postal Card.

STEEL BAR WEIGHTS: A new booklet that lists tables of weights of round, square, hexagon, octagon, and flat steel bars has been announced by Dyson & Sons, Inc., 5125 St. Clair Ave., Cleveland 3, Ohio. The booklet has 34 weight tables of flat steel bars covering thicknesses from 1/6 in. through 11 7/8 in. in widths ranging from 1/8 in. through 23 3/4 in. in lbs. per lineal in. In addition decimal equivalents, tables of area and circumferences of circles and other formulas are listed.

For more details circle 166 on Enclosed Return Postal Card.

SHALLOW BORING: An illustrated broadside showing and describing recently designed equipment for shallow hole boring and sampling requirements was released by Giddings Machine Co., 401 Pine St., Fort Collins, Colo. Types of mounting and accessories are detailed, accompanied by design and operating features.

For more details circle 167 on Enclosed Return Postal Card.

RIDING TRACTOR: The application and use of the 7 hp. Deaver riding tractor for the maintenance of parkway and highway grounds area is described in a new literature being offered by Deaver Tractor Div., The Baird Machine Co., Stratford, Conn. The Brouchure describes the various design and construction features of the tractor including a special transmission. Optional attachments are also shown.

For more details circle 168 on Enclosed Return Postal Card.

Eimco 123 Front End Loader, featuring "single stick" control of all bucket actions. The largest steel casting in the 103 is the single-piece main frame, center housing and twin final drive housing. These castings are so shaped and so formed that internal stresses and stresses due to applied loads "flow" evenly throughout the structural member.

Michigan Adopts New Underwriting Standards

The Michigan state highway department has adopted a new plan setting financial standards for surety companies who write performance and lien bonds on state road construction contracts.

The plan, recommended by highway commissioner John C. Mackie's Highway Industry Advisory Committee, calls for use of the U. S. Treasury Department's list of acceptable sureties on federal bonds. The list is checked every three months by the Treasury Department and is supplied all federal bond approving officers.

Mackie said the Michigan State Highway Department had no prequalification standards and no regulation on the amount of work that could be insured by any one company when he took office. A study of the situation was started by the Advisory Committee at his request last year. The effect of the new regulation will only limit the dollar amount of work on individual road projects which can be underwritten by firms, based on Treasury audits.

With the Manufacturers

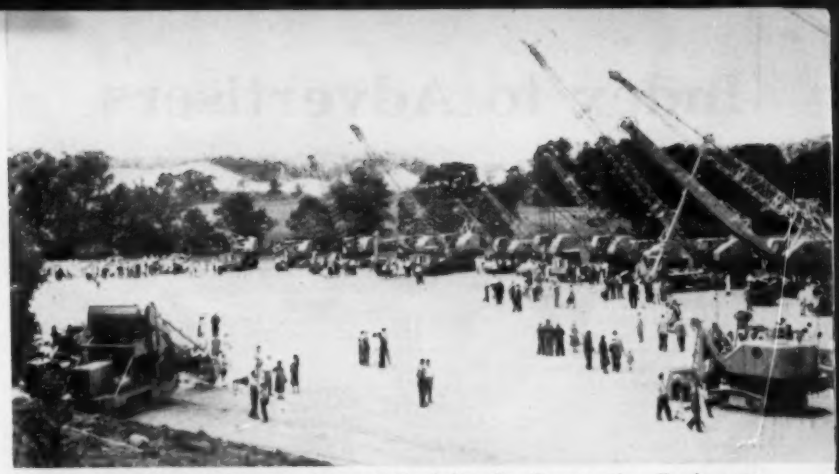
J. I. CASE has announced the appointment of Leon T. Newman to the post of treasurer. Newman succeeds W. B. Peters who will retire at the end of this year after 50 yrs. of service with the company. Peters began his career with the company as a clerk in 1910.

CANADIAN CLARK LTD. has announced the election of Clarence E. Killebrew as president of that corporation. Killebrew will succeed George Spatta, who will become chairman of the board of directors.

VICKERS INC., a Division of Sperry Rand Corp. has appointed Duncan B. Gardiner as manager of corporate engineering. Gardiner is a member of SAE, ASME and LAS.

KERRIGAN IRON WORKS CO., a subsidiary of Rockwell-Standard Corp. is now installing machinery and equipment for the manufacture of seamless, round-tapered aluminum lighting standards. Mr. Cooper, vice president of Rockwell-Standard, commented that most of the nation's streets and highways are inadequately lighted but suggested that the public is becoming more aware of the problems through the press, municipal promotion and utility projects.

CHRYSLER CORP., has completed an agreement with F. Perkins Ltd. of Peterborough, England to market Perkins Diesel engines in the U. S. and Canada, it was announced. The agreement will provide a complimentary line of marine, industrial and agricultural diesel engines to augment the gasoline line now produced by Chrysler Marine and Industrial.



Equipment displayed during the 1958 Koehring Co. Construction Equipment Show, held at Koehring's Proving Grounds near Waukesha, Wis. The 1960 Koehring show will be at the same place and will have many more machines on display.

WHAT ABOUT YOU, MR. READER?

Are you still active in the field? Have you moved or changed your position?
Unless you send this information directly to use we can't be sure. Sometimes a reader's name is cut from the mailing list because we are not sure that our information as to name, title and address is right. *Your* name might be cut from the mailing list.

Don't Let This Happen to You

Even if you think we know all about you, please fill in the information requested below and send to us by return mail. Our auditors require proof of accuracy of our mailing list. *You* are the only person who can help us on this. Do it now before you forget, so you can be sure your magazine will always be properly addressed to you. New names cannot be added or old names retained on our list unless we have *all* this information. *Please print or type.*

ROADS AND STREETS DATE_____

22 WEST MAPLE STREET, CHICAGO 10, ILL.

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☐ I do not receive ROADS & STREETS but would like to have it.

NAME

TITLE OR OCCUPATION

FIRM NAME OR GOVERNMENT DEPARTMENT (give street address)

CITY ZONE (if any) STATE
(If you have moved give *old and new* address)

SIGNATURE

Index to Advertisers

The new No. 12 Series E Motor Grader spreads untreated base and handles cleanup for Massey Sand and Rock Company

THE NEW NO. 12E SETS THE STANDARDS

Widening U. S. 60-77-99 to a 4-lane limited-access highway, Massey Sand and Rock Company of Indio, California, recently added a new No. 12E Motor Grader to its Cat fleet. The improvements, effective with this new series machine, showed up immediately. As Tom W. Carter, manager of the firm, puts it: "The increased productivity of the new No. 12 was very noticeable. You can depend on new Cat products to give greater operator comfort and better productivity."

One of the big reasons for the new performance standards of the No. 12 is the new compact 115 HP engine. Incorporating the latest developments in metallurgy and design, this modern engine has greater lugging ability for the tough jobs, long life and easier servicing.

Caterpillar engineers did not stop with just a compact diesel. There's a new vertical starting engine to give easier, all-weather starting. The dry-type air cleaner is now standard—it removes 99.8 per cent of air-borne dirt every service hour, cuts maintenance.

. . . for more details circle 287 on enclosed return postal card

Of course, the new No. 12 retains the dependable Caterpillar oil clutch that gives up to 2000 hours without adjustment; mechanical controls that engage easily; and plenty of throat clearance between moldboard and circle for improved rolling action.

See your Caterpillar Dealer. He'll show you—on your job—that the No. 12E lives up to what users are saying about it. He can also show you the 150 HP No. 14, the No. 112F with 100 HP and the No. 112E with 85 HP—they're built to be the best for the job.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

THE NEW NO. 12 MOTOR GRADER BUILT FOR THE TOUGH JOBS

Illinois Route 125, five miles west of Springfield. Texaco Asphalt pavement laid by P. H. Broughton and Sons.

Illinois Route 88 near Walnut. Paved with Texaco Asphalt by J. P. Hollerich Company. Note asphalt center island.

Illinois traffic flows smoothly over resilient, joint-free Asphalt

Here are three segments of the Illinois state highway system totaling 24 miles, which have the same type of pavement. Traffic on all three is served by hot-mix Texaco Asphaltic Concrete.

On these Illinois highways, as on the Massachusetts and Connecticut Turnpikes and Virginia's Richmond-Petersburg toll road, this resilient, rugged pavement demonstrates its ability to stand up under punishing impact with a minimum of maintenance. Thanks to its resilience and freedom from expansion joints, motorists enjoy its velvet smooth riding quality. Danger of accidents is reduced by the skid-resistant texture of hot-mix Texaco Asphaltic Concrete and by the sharp visibility of traffic lines on its dark, glare-free surface.

In addition to its other important advantages, hot-mix Texaco Asphaltic Concrete is speedily laid and requires no time consuming curing period. It is the ideal heavy-duty pavement for highways, streets and airports, particularly for the Interstate Highway System.

Illinois Route 80 on Jo-Daviess County. Texaco Asphalt pavement laid by Rock Road Construction Company.

If you have a paving problem, our 55 years of Asphalt experience is at your service. Write our nearest office if you would like to discuss your problem with one of our field representatives. Mail the coupon below for helpful Asphalt paving literature.

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